Journal of the Society of Arts.

FRIDAY, AUGUST 5, 1859.

NOTICE TO CANDIDATES.

The Certificates are in preparation, and will shortly be sent to each Local Board for distribution among the successful Candidates.

PROGRAMME OF THE EXAMINATIONS FOR 1860.

The Programme of the Examination for May, 1860, is now published, and two copies of it are sent by this day's post to each Institution in Union.

JAPAN WAX.

Specimens of this substance,* and of the seeds of the plant from which it is procured, have been deposited at the Society's House, and may be inspected by all those interested in such products.

EXHIBITION OF 1861.

Mons. Barbedienne, of Paris, so well known for his bronzes d'art, and who received the highest medals for his works, both in 1851 and 1855, says, in writing to his correspondent in London, under date of July 31st:—

"Now that peace appears to become more firm every day, will it not be possible to return to your project for the Exhibition of 1861?

"It appears to us that it is the duty of Commerce and Industry to rely with confidence on the interests of nations, and to discard all foolish and transient causes of antagonism and strife.

"In the actual state of things, a Great Exhibition in London would have a double salutary effect, both in the industrial as well as in the political world."

"Personally, I will do everything in my power to promote so noble and excellent a cause."

EXAMINATION PAPERS, 1859.

The following are the Examination Papers set in the various subjects at the Society's Final Examinations, held in May last:—

ARITHMETIC.

THREE HOURS ALLOWED.

(1.) A house contains 15 windows, and each window 16 squares, each measuring 21 inches by 16 inches. What will be the expense of glazing the whole at 10½d. per square foot?

(2.) After using $\frac{2}{5}$ths. of a cheese, $\frac{3}{8}$rds. of the remainder sold for £1 2s. 5½d., what was the whole cheese worth?

(3.) Convert £147 11s. 7¾d. and £69 15s. 9¼d. into a decimal currency, £1 being the unit; then find the difference, and divide it among 24 men, expressing the result in the present currency.

(4.) Work the following by decimal currency. If 27 persons spend £127 11s. 6d. in seven weeks, how many weeks would £145 16s. last nine persons?

(5.) A railway company pays 8 per cent. upon the original shares of £60, what rate of interest shall I receive when I purchase shares at £20 premium?

(6.) What would a banker gain by discounting, on September 21st, a bill of £318 3s., dated July 31st, at 4 months, at 5 per cent.?

(7.) What would be the difference in annual income from investing £3,450 in the 4 per cents. at 92, and the 3½ per cents. at 69?

(8.) Find what decimal multiplied by 36 will express the sum of $\frac{1}{8}$, $\frac{7}{16}$, $\frac{11}{12}$, and $4\frac{1}{4}$.

(9.) By selling goods at £3 14s. 6d. per cwt., which cost me 50s. per cwt., I gained two guineas, what quantity did I buy?

(10.) A person contracted to complete 500 yards of railway in 40 days, and hired 120 men for that purpose; but at the end of 25 days he finds only 200 yards finished. How many more men must he employ to finish the work in the given time?

(11.) A. has goods worth 15s., which he charges to me at 15s. 6d., allowing 6 months' credit. I in return give him goods worth 40s., charging him two guineas. How long credit should I give him to make the transaction equitable?

(12.) Two men shoot by turns at pigeons let out of a trap; the one hits 3 birds out of 5, the other 5 out of 8. How many shots must each have to kill 98 between them?

(13.) A railway train having performed a journey at ⅔ths. of its proper speed, arrived at the terminus two hours and a half behind time. In what time should the journey have been performed?

(14.) If the area of the British Islands be 91,000 geographical miles, or 122,000 statute square miles, find the length of a geographical mile correct to two places of decimals in inches.

(15.) Find the cost of a mirror, with a frame three inches wide, if the glass be 2ft. 8in. long and 1ft. 10in. broad, at 3s. 6d. a square foot, the cost of the frame being 11d. per lineal foot.

(16.) Of the adult male population in a village, the proportion of those who are labourers is 11 in 20; of tradesmen, 7 in 24; of professional men, 9 in 80; and there are besides 33 gentlemen—how many male adults in all?

(17.) English gunpowder contains 75 per cent. of nitre, 15 per cent. of charcoal, and 10 per cent. of sulphur, and a mixture of equal quantities of English and French gunpowder contains 76 per cent. of nitre, 14·5 per cent. of charcoal, and 9·5 per cent. of sulphur. Find the per centage of each ingredient in French gunpowder.

(18.) The circumference of the fore wheel of a carriage is 6½ feet, and that of the hind wheel is 8½. When the fore wheel has made 200 more revolutions than the hind wheel, what is the distance travelled?

(19.) Two travellers sit down to a meal, one has 5 loaves, the other 3. They are joined by a stranger who shares equally with the other two. All the loaves are eaten, and, on departing, the stranger gives to one of the travellers 3 pieces of money and to the other 5. Was this an equitable payment? If not, find how many pieces he should have given to each.

(20.) Two third-class passengers, for the same journey, are charged 3s. 4d. and 8s. 4d. respectively, for excess of luggage. Had the luggage all belonged to one of them, he would have been charged for excess 35s. How much would they have been charged, if no luggage had been allowed free?

(21.) A hat which cost 10s. will last 7 months, and one which cost 18s. will last 13 months; which is the cheaper? How much would be saved at the end of 3 years by wearing the cheaper kind of hat rather than the other, allowing simple interest at 5 per cent. per annum?

* See last number of the *Journal*, p. 611.

BOOK-KEEPING BY DOUBLE-ENTRY.

THREE HOURS ALLOWED.

(1.) What is the distinguishing feature or principle of the double-entry method of book-keeping, as compared with that of single-entry?

(2.) Does the double-entry system provide absolute security for the prevention or detection of every kind of error or mistake to which the book-keeper is liable?

NOTE.—*State reasons for the answer to the question.*

(3.) Specify the principal books usually adopted in keeping accounts by the system of double-entry, and their respective uses.

(4.) Can the principle of double-entry be maintained in the keeping of any set of accounts without a Journal?

(5.) Adopting the ordinary division of accounts under the several titles of *Real*, *Personal*, and *Impersonal* (or *Nominal*), state what is the proper object of each of those heads of account.

(6.) Write out in proper technical form the Journal entries of the following transactions, viz.:—

Purchased of John Vulcan, 200 tons of iron at £5	£1,000
,, of Cyclops and Co., 100 tons of iron at £4 10s.	450
Sold to Mars and Co., 500 tons of iron at £6	3,000
Paid Cash to John Vulcan	1,000
,, ,, to Cyclops and Co.	450
Received Cash of Mars and Co. on account	2,000

(7.) Post the same transactions to appropriate Ledger Accounts.

(8.) What facts should be entered respectively on the *credit* and *debit* side of a Profit and Loss Account, and what should its final result exhibit?

(9.) What is the distinction between *Gross* and *Net* Profit?

(10.) In the case of a ship-builder, for example, how should the wages paid to mechanics and artisans be treated with reference to the distinction between *Gross* and *Net* Profit?

(11.) What is a Trial Balance, and what purpose does it serve?

(12.) What should a Balance Sheet exhibit?

(13.) Work out the following suppositious facts and transactions of a month by double entry, through the Journal and Ledger in proper technical form, and produce:—Firstly, a Trial Balance; and, secondly, a Balance Sheet accompanied by a Profit and Loss Account.

Note.—It is not *required* in this exercise that the distinction between *Gross* and *Net* Profit be attempted.

On the 1st of January, 1859, Henry Grey commenced business with a capital of £2,000, which consisted of:—

Cash		£1,000		
Bills receivable:—				
Due 20th Jan.	£100			
,, 4th May	150			
		250		
Iron		750		
Total		£2,000	0	0
Jan. 10. Purchased of Vulcan and Co., iron		£2,000	0	0
,, 12. Purchased of Cyclops and Co., do.		450	0	0
,, 12. Sold to Mars and Co., do.		3,000	0	0
,, 12. Received of Mars and Co., their acceptance, due 4th April		1,000	0	0
and cash		1,500	0	0
,, 13. Discounted with John Gride, Mars and Co's. acceptance, due 4th April, for		1,000	0	0
,, 13. Received from John Gride, cash,		990	0	0
and allowed discount to him		10	0	0
,, 14. Accepted Vulcan's and Co's. draft, due 4th May		2,000	0	0
Jan. 15. Purchased of Vulcan and Co., iron		800	0	0
,, 16. Paid cash to Vulcan and Co., in settlement of the foregoing purchase		770	0	0
On being allowed by them an abatement of		30	0	0
,, 16. Accepted Cyclop and Co's. draft, due 30th instant, in part payment of iron purchased of them		200	0	0
,, 16. Cash paid to Cyclops and Co.		250	0	0
,, 17. Cash paid for 2 weeks' wages, to labourers		30	0	0
,, 17. Cash paid Freight on account of iron		140	0	0
,, 17. Cash paid Clerks' Salaries		20	0	0
,, 18. Cash received of Mars and Co., they having failed 10s. in the £ in discharge of balance of £500 due from them		250	0	0
,, 18. Write off loss by Mars and Co.		250	0	0
,, 18. Cash lent to John Minus at 5 per cent. interest		1,000	0	0
,, 19. Cash paid for horse-keep		15	0	0
,, 20. Sold to Bellona, iron		650	0	0
,, 20. Sold to Argus, iron		380	0	0
,, 20. Received from Bellona, her acceptance due 31st instant		650	0	0
20. Received cash for bill receivable due this day		100	0	0
,, 21. Cash paid for petty cash disbursements, to be accounted for		£ 20	0	0
,, 22. Bought of Tubal Cain, iron		780	0	0
,, 23. Sold to Mercury, iron		600	0	0
,, 30. Cash paid, acceptance in favour of Cyclops and Co., due this day,		200	0	0
,, 31. Charge John Minus with interest of loan of £1,000 to this day		2	1	8
,, 31. Interest on capital, one month, on £2,000		8	6	8
,, 31. Rent of counting-house, due to John Nokes		15	0	0
,, 31. Drew out cash on private account of H. Grey		300	0	0
,, 31. Cash paid, two weeks' wages to Labourers		30	0	0
,, 31. Stock of Iron on hand, at this date		850	0	0

Nota bene.—Candidates who reply to No. 13 need not reply to either No. 6 or No. 7; but "SATISFACTORY ANSWERING" in No. 13 will be deemed an indispensable condition of "a HIGH DEGREE OF EXCELLENCE."

ALGEBRA.

THREE HOURS ALLOWED.

(A.)

(1.) Add together the following quantities:

$$15a^3 - 21a^2b + 24ab^2 - b^3,$$
$$-2a^3 + 4a^2b - 12ab^2 + 2b^3,$$
$$\text{and } 12a^3 - 8a^2b + 13ab^2 + 24b^3.$$

(2.) Subtract $2a - 2b + 3c - 3d$, from $3a + 6b + c + 3d$.

(3.) Multiply $a + a^{\frac{1}{2}}b^{\frac{1}{2}} + b$, by $a - a^{\frac{1}{2}}b^{\frac{1}{2}} + b$.

(4.) Divide $x^6 - 6x^5y + 15x^4y^2 - 20x^3y^3 + 15x^2y^4 - 6xy^5 + y^6$ by $x^2 - 2xy + y^2$.

(5.) Find the highest common divisor of the expressions $x^6 + x^2y - x^4y^2 - y^3$, $x^4 - x^3y - x^2y^2 + y^3$.

(6.) Solve the following equations:—

$$\frac{x-1}{2}+\frac{2x-7}{3}=x-2$$

$$\frac{x}{x-1}+\frac{x-1}{x+1}=\frac{7}{3}$$

$$\left.\begin{array}{l} x^3+x^2y+xy^2+y^3=15 \\ x+y=3. \end{array}\right\}$$

(7.) A ratio of greater inequality is increased; and a ratio of less inequality is diminished, by taking from both terms of the ratio any quantity which is less than each of those terms.

(8.) The wages of 5 men for 6 weeks being £14 5s., how many weeks will 4 men work for £19?

(9.) If one solution of a quadratic equation be imaginary, prove that the other is also imaginary.

(10.) Eliminate x from the two equations:—

$$ax^2+bx+c=0$$
$$a_1x^2+b_1x+c_1=0$$

(B.)

(11.) What is the interpretation of the symbol $a^{\frac{1}{n}}$? On what principle do you assert that $a^{\frac{1}{m}} \times a^{\frac{1}{n}} = a^{\frac{1}{m}+\frac{1}{n}}$?

(12.) Show that every quadratic equation has two roots and no more.

(13.) Investigate the method of finding the cube root of a polynomial expression; and hence explain the process of finding the cube root of a number. How could you most easily in practice find the cube root of a numerical quantity.

(14.) When is one quantity said to *vary* as another?

If $ax^2+by^2 \propto xy$, then $ax^4+by^4 \propto x^2y^2$.

(15.) A pedestrian starts 4 hours before a coach; both travel uniformly, and the coach overtakes the pedestrian after a certain number of hours. From this point the coach increases its speed in the ratio of 6 to 5, while the man increases his in the ratio of 5 to 4, and they continue at these increased rates for 12 hours longer than it took the coach to overtake the man. They are then 92 miles apart; but had they continued for the same length of time at their original rates they would have been only 80 miles apart. Find the original rates of the coach and man respectively.

(16.) Determine the condition which must be satisfied in order than the expression x^2+ax+b may always be positive, whatever value be assigned to x.

Can any similar condition be found for the expression x^3+ax^2+bx+c?

(To be continued.)

THE CHINESE GREEN COLOUR *LO-KAO*, AND SOME OTHER DYES.

By PROFESSOR S. BLEEKRODE, DELFT.

In 1846, cotton goods dyed by a vegetable green colour were introduced and exhibited by the French commissioners, for the trade of China, at Lyons, St. Etienne, &c., and other sorts, forwarded by M. de Montigny, the French consul at Shang-hai, were exhibited by the Chamber of Commerce, at Mulhouse, Rouen, and Lille. Mr. Daniel Koechlin-Schouch was the first who, in 1848, directed attention to the characteristic green dye, applied in such a way that only one side was coloured, the reverse being nearly without colour. This observation was made by the chemist to the firm of Koechlin and Benzard, at Rouen, in 1854. It was stated that this green colour was not a mixture of blue with yellow, but a pure and simple green, distinguished from all the other shades of that colour by its remaining pure in artificial light.

In 1852, the genuine green colouring matter was forwarded, by Mr. P. S. Forbes, the consul of the United States, to M. Persoz, at Paris; a small quantity (only one gramme) being divided between M. Koechlin-Schouch (Mulhouse), M. Guinon (Lyons), and M. Espinasson (Rouen).

In October of the same year, M. Persoz made his first report to the Académie des Sciences, and in November immediately followed a communication by Professor Seringe to the Chamber of Commerce, at Lyons. This Chamber requested M. Natalis Rondot to procure five kilogrammes (11½ pounds avoirdupois weight) from China. This order was executed by Mr. D. Remi, at Shang-hai, and in October, 1853, were received 160 taels = 5.59 kilogrammes, valued at 2,158 francs 33 cents. Several months before, however, M. Guinon was in possession of 256 taels of first quality, and two taels of second quality, bought by Messrs. Carvalho and Co., at Canton.

Towards the end of 1853, the same colouring matter was imported by the Dutch consul at Amsterdam. The results of the examination by Mr. Walter Crum and Mr. Mercer, of a small parcel sent over by M. Persoz, were published in Appendix L to the First Report of the Department of Science and Art, p. 432. Mr. Mercer ascertained the identity of the Lo-kao with the green colour of the Chinese cotton goods, and was of opinion that it was applicable for steam and self-dyed colours. Mr. Walter Crum considered it useless to the dyer unless means were found of dissolving it like indigo. Notwithstanding these inquiries, the firm of Halliday, Pochin and Co., at Salford, owing to a lecture delivered by Mr. Crace Calvert, in December, 1852, applied to the Board of Trade, that some investigations relating to this matter in China might be ordered to be made. Mr. Meadows, interpreter at Ning-po, forwarded, in 1853, the *Hwae-hwa*, being the undeveloped flowers or buds of the *Sophora japonica*, already cultivated in Kew gardens, and at Lyons, since 1847. (Annales de la Société Royale d'Agriculture de Lyons, March 1847). The firm of Renard, père et fils, tried it for dyeing silk yellow. It was introduced into Germany under the name of "Chinesisch Gelb-beeren" (yellow berries of China), and "Natalkörner" (grains of Natal). W. Stein, von Kurrer, &c., have published the results of their chemical and practical experiments. (Pharmac. Centralblatt, 1853, pp. 193 and 845.) The same material was forwarded by the Dutch consul, who stated that it was employed to produce the green dye on cheap cotton cloth.

Mr. Sinclair, interpreter at Emoei, sent in a report relating to the same substance. It appears, from both communications, that this yellow was applied on a blue ground to produce a green, but this was not the direct and actual production of a green dye with Lo-kao. It was quite true, as Mr. Mercer says, that the *Hwae* failed in giving any indication of green. Mr. Walter Crum says: the substance produces a yellow dye, which in China "becomes green by an exposure of some duration to the sun; but here, after three or four days there are only signs of such a change being about to take place." But this was a supposition. The Chinese are careful to avoid the direct action of the sun on their cloths of Lo-kao-green. Mr. Sinclair says, that the cotton cloth is spread out on the ground in the open air, but not after the hours of nine and ten, when the sun becomes too powerful.

During and after the Paris Exhibition of 1855, the value of the Chinese colour applied to silk, became more and more appreciated. The *nouveautés* of this shade were much admired for the splendour and purity of their colour by artificial light, when the usual mixed green colours change to blue. The "Velours épinglé et coupé en vert Vénus" exhibited by the firm Gaudre et Co., occu the first position among the articles of fashion during the spring of 1855. In July following, a new shade, obtained by mixing with yellow, was produced, under the name "Vert-Azof," and in August, evening dresses so dyed were sold by Million and Co., and in October and November in the Magazins of Heckel, Teillard, and Ponson. Relating to the application of the Lo-kao, M. Michel and M. Guinon have the merit of

discovering the best method of dissolving it for dyeing silk. M. Guinon has kept the method secret.

From April 1855-56, he has dyed 1500 kilogr. silk.
,, 1856-57, ,, 3500 ,,
with this colouring matter.

M. Michel has published his valuable investigations, which have been printed by order of the Chamber of Commerce at Lyons ("Rapport sur le Vert de Chine," par M. A. F. Michel, imprimé par ordre de la Chambre; Lyons, 1856). In 1857 a new paper was published by the same Chamber ("Concours pour la recherche du vert de Chine, dans les végétaux indigènes et exotiques"). The value of Lo-kao was confirmed by its increased use for dyeing silk, the quantity imported during the first six months of 1857 being 1100 lbs., of the commercial value of nearly £8000; from this it is evident how considerably its application in France has increased. The prices are variable; they ranged in China from 24 to 25 piastres per *katty* (0·6045 kilogr. = 1⅓ lb.) At Lyons the kilogramme was sold at from 700 fr. to 500 fr. There are several qualities, the first being the original from Soe-tsjeoe-foe; then follows the second, from Canton; and the third is prepared at Emoei, being the least valuable.

The Lo-kao of commerce is not a pure organic substance. Even when genuine it contains 30 per cent. of inorganic matter, which remains as ashes after incineration. I found 30.60 per cent. It contains from 9 to 10 per cent. of water. It is properly a mixture of finely-divided colouring matter with clay, so that nearly one-third of such a costly substance is of no use at all.

100 parts of ashes give substances—

Soluble in water	1·96
Soluble in hydrochloric acid ...	45·00
Insoluble.....	53·04
	100·00

The constituents of the ashes are not from impurities, notwithstanding that on the last occasion some were detected. It appears to be impossible to avoid these by the Chinese method of preparation, for the Lo-kao is not a simple exsiccated vegetable juice, like the indigo or other colouring matters.

The Chamber of Commerce at Lyons, after offering a premium of 6000 fr. for the preparation, &c., of a genuine pure dye matter, like the Chinese Lo-kao, published the above-mentioned paper, "Concours, &c.," containing several communications relating to this substance. The most interesting was that of the Rev. Père Hélot, being a description of the Chinese plants, of the process of dyeing at Azé, and of the preparation of Lo-kao. A communication of a similar character was forwarded by the Dutch interpreter at Emoei, M. de Grys, dated 30th May, 1857 ("Journal de Volksvlijt," Nov., 1857). The other documents are—a letter of M. Aymery, Procureur des Missions des Lazaristes at Ning-po, dated 22nd August, 1856; and one from the Rev. T. Edkins at Shang-hai, containing some explanations, but no contradictions. There was also published a report of the Agricultural Society at Calcutta upon the experiments of Mr. Murray for cultivating the Chinese plants in the garden of the Society, dated March, 1854. Mr. Fortune forwarded the plants and seeds to Calcutta. M. Persoz, at Paris, who in 1857 was invited by the Agricultural Society of Calcutta to report on several materials, received only one piece of cloth of the original green colour. Living plants have been forwarded by M. de Grys to Holland, and received in May, 1857; they are at present in the Botanical Gardens at Leyden.

M. Natalis Rondot, celebrated for his profound knowledge of the Chinese and Oriental trade and commercial science, has the special merit of having indicated and assisted in importing plants and seeds of the vegetables from which the *Lo-kao* is prepared by the Chinese. He distributed the seeds from which plants have been cultivated at Lyons, Paris, Ghent, &c.

It had been already stated by the Rev. Père Hélot that the Chinese employed two different sorts of plants, one with a *white* bark, Pa-bi-lo-za, and another with a brown bark, Hom-bi-lo-za; one growing wild, and the other cultivated; but till the return of Dr. Lockhart from China, in 1857, it had not been possible to decide this. The Pa-bi-lo-za is the *Rhamnus chlorophorus*, of Decaisne, and grows wild, the Hom-bi-lo-za is *Rhamnus utilis* of Decaisne, the cultivated plant. The first was introduced into Europe by M. Rondot, and was formerly called by Prof. Seringe, at Lyons, *Rhamnus sinensis;* the other by Mr. Fortune, and is now cultivated at Acton-green by Dr. Lindley, and at Turnham-green by Mr. Gledinning; at Ghent by Mr. Van Houtte, etc.

M. Natalis Rondot published, at the commencement of last year, an admirable paper, by order of the Chamber of Commerce, entitled "Notice du vert de Chine et de la teinture en vert chez les Chinois, suivie d'une étude des propriétés chimiques et tinctoriales du Lo-kao, par M. T. Persoz, et de recherches sur la matière colorante des nerpruns indigénes, par M. A. F. Michel, Lyons, 1858." This valuable work gives a review of whatever is at present known relating to this specialty.

The Lo-kao does not contain any principle that resembles the constituent of indigo, although it has been often spoken of as a green indigo. Poivre, who visited Cochin China in 1749, speaks of a plant, Tsai, producing a green dyeing matter. Horta, in 1760, mentions the same as employed by the Tonquinese. The word Tsai, however, is an adjective ,applied to several herbaceous and leguminous plants, and hence nothing could be distinctly known by this denomination. Charpentier de Cossigny speaks of another substance—Dinh-xang; xang or xanh signifies, in the Cochin Chinese language, green. Mr. Hedde, who visited Tooran in 1844, said that the price of such a dyeing material per kilogramme was 2s. 6d., and that it is probably collected from the *Mercurialis perennis*. It may then be concluded that Tsai and Dinh-xang were up to that time unknown materials.

Green indigo was imported into London in 1790 by Prinsep, and examined by Mr. Bancroft. This was supposed to be the Tsai of M. Poivre; but, as M. Persoz observed, it was only a mixture of chlorophyll (leaf-green) with indigo. Attempts were often made in India to produce a green material of the same composition. Kurrer speaks of it 1801; Mr. Nicholas Cézard, in 1837; it was examined by Gustavus Schwartz of the Société Industrielle de Mulhouse; and in 1856 I received a specimen from Java of the same character.

The green coloured Barasat, forwarded by Mr. C. Birch, in 1793, from Calcutta, to Messrs. T. F. Baring and Co., and examined by Bancroft, was identical in composition. It was at that time supposed to be prepared from the *Asclepias tinctoria*, Roxb., but afterwards it was acknowledged to be the Taroem akkar or indigo of Sumatra, from the *Marsdenia tinctoria*, Rob. Brown, *Pergularia tinctoria*, Spr. *Taroem* signifies at Sumatra indigo. Marsden (in the History of Sumatra, ed. 1811, p. 94) mentions it as generally employed as a blue dye in Sumatra; the plant being common in the Indian Archipelago. The plant is likewise common in Borneo, but does not grow in Java; another species, *Marsdenia parviflora*, Dee, or Taroem aroi, is cultivated there.

In his report on the Paris Industrial Exhibition of 1855, the late Dr. Royle noticed three kinds of green (indigo), one Chinese, one from the Birman empire, and one from Assam. The last was exhibited by Dr. Falconer, under the name of *Roem*. This was quite different from the Lo-kao, being a product of a sort of *Ruellia*, generally cultivated in the Birman Empire and Pegu. Lila roem is the indigo, from the *Wrightia tinctoria*, R. Br.

It is not astonishing that the name Lo-kao is pronounced and written in various ways. This is commonly the case when an Englishman, Frenchman, or Dutchman expresses a foreign term according to his own language. The Lokao of M. Rondot is Lak-kou (Carvalho), Luk-kaou (Edkins),

Lau-kow (Remi), Louk-ko (at Canton), Liok-kou or Lèk-ko (at Fokien), Loe-kaau (De Grys). Mistakes frequently occur, therefore, when a European communicates with the natives, and hence Mr. Forbes, when asking for the green dye, received from the Chinese the Schweinfurther green, a European product, in a Chinese bottle, with Chinese inscriptions.

The plant is called Lo-sa; that with white bark pa-bi (or pe-pi), and that with brown bark, hom-bi (or hong-pi). The Pa-bi-lo-sa, or *Rhamnus chlorophorus*, ranges from 25° to 26° N.L., and principally between 30° and 31° in the mountains of Khiu-tsjeou-foe, at the S.W. of Tsje-kiang, and at Canton, Hang-tsjeou-foe, Kia-hang-foe, and Ning-po. Fagots of it are sold at 17s. per two hundredweight, but the bark only being 50 per cent., its price is properly double of this sum. The Hong-bi-lo-sa or *Rhamnus utilis* is found from 30° to 39° N.E., also in a more temperate climate. The fagots are sold at 7s. per hundred weight, the bark costing 14s.

M. Rondot is of opinion that both plants could be acclimatised in the south of France.

It was not less difficult to decide what parts of these plants were employed. In 1852, Mr. Bourboulon, at Macao, and Mr. Carvalho, at Canton, reported to the French Minister of foreign affairs, that the flowers and foliage were used, but M. Persoz, at Paris, received some cloth dyed by the colouring matter obtained from the roots. MM. Marc Arnaudtizon, Edkins, Hélot (as usually at Azé) Aymery (as usually at Tsji-li) noticed the bark.

It appears that the fruits being small black berries, with a hard nucleus, as large as that of the hemp-plant, contain likewise a colouring matter. The Rev. Père Hélot denies this. Mr. Edkins, however, asserts that the Chinese prepare from it a green colour, and M. Remi confirms this, saying that it is specially employed for both water and oil-painting, whilst the bark serves to dye cotton cloth. Mr. Fortune noticed that the colouring matter of the fruit is used for painting on paper.

The Lo-kao (translated in our language green paste) is the sediment remaining after dyeing the cotton cloths with the bark of both plants, a thousand pieces producing only one kilogramme. A friend of M. Rondot, at Shang-hai, wrote to him that he should be able to send over 800 or 900 lb., which would be the sediment after the dyeing of a million of pieces. This, however, is not astonishing, when we consider that the colour green is that most liked by the Chinese, for in several places regular green-dyeing establishments exist in that country.

The fagots, not older than one year, are cut in small pieces, and the colour is extracted by boiling in water. At Azé, both sorts of plants are boiled and extracted in separate vats; in another vat is prepared lime-water. The cotton cloth is dyed from seven to ten times in the extract from Hom-bi-lo-sa, and then three times in the extract from Pa-bi-lo-sa. Before dyeing, a small quantity of lime-water is mixed with the liquid extract. The cloth is dyed in the afternoon, spread out in the fields during the evenings, and taken up in the morning before nine or ten o'clock, so that the cloth only undergoes the action of diffused daylight. The effect is that the upper side becomes green, the under side remaining quite colourless. When at first this characteristic appearance of the Chinese green cloth was observed in Europe, it was supposed that the colour was applied by brushes or some other mechanical means, totally unknown to the European dyer. Such was the opinion of Mr. Mercer, and M. Persoz. Since, however, M. Michel, at Lyons, had succeeded in producing a green colour by the action of sunlight alone on cloth, dyed with an indigenous evergreen sort of *Rhamnus*, M. Persoz acknowledged it to be a new, and, till now, unknown effect of sunlight in producing vegetable colours.

After spreading, the cloth is rinsed in vats with pure cold water; there are five or six arranged in a row. The water assumes a light green colour. All the wash-waters are collected in one vat, the bottom of which is covered with cotton thread. By boiling, the colouring matter is precipitated on the cotton, and the water above becomes colourless. From this cotton the colouring matter is separated by merely pressing and wringing, and then spread on blotting paper and dried. The Lo-kao then assumes the appearance of thin scales, like dried orange bark.

Persoz assumes, as a distinctive new principle or constituent of the Lo-kao, the *Cyanine*, a substance not containing nitrogen. As I before stated, the ashes contain 45 per cent. of matter soluble in hydrochloric acid; of this are 31·16 lime (Ca O), so that nearly $\frac{1}{3}$ of the ashes are lime; 13·24 per cent. ($Fe_2 O_3$) oxide of iron, alumina and phosphoric acid, probably decomposed from the clay of the ground where the cloth has been spread. It must be remarked that the Chinese distinguish the cloth dyed with the extract of the plants, Se-lo-poe, with one coloured side, from the cloth dyed with Lo-kao, the latter being called Oe-lo-poe, coloured on both sides, as usual.

It is a characteristic of the green-dyed Chinese cloth that its colour, when moistened with concentrated hydrochloric acid, vanishes, but after some time reappears. This experiment can be repeated several times without destroying the dye. The colour is changed to purple red by the action of hydro-sulphate of ammonia; chloride of tin changes it to salmon colour. On that ground M. Persoz supposes that there is really mixed with it a yellow colour, derived from a substance resembling the Persian berry. Should this be further confirmed, it will agree with the information I have received that the Hwa-wha is used for reviving the green colour of Lo-kao in dyeing common cotton cloth.

M. Natalis Rondot says, likewise, that all his inquiries tend to show that the yellow colour of Hwa-wha, or of the Hoang-tsji, is employed to vivify the bluish green of the Lo-tsé. This explains why the Lo-kao of Soe-tsjeou-foe is more tending to blue, and that of Emoei more to yellow. The properties of the Lo-kao are, according to the description of M. Persoz, as follows:—

Lo-kao is insoluble in water, soluble in alcohol, ether, sulphide of carbon, and volatile oils. By soaking it can be intimately mixed with 25 or 30 parts of water. By heat it is decomposed without sublimation; on burning it gives a light yellow flame. Acetic acid facilitates its being dissolved, and the mineral acids, hydrochloric and sulphuric acid, have the same effect; a weak solution of tartaric acid rapidly dissolves it at ordinary temperatures. The reaction consists principally in dissolving the combinations with lime. The above-mentioned acids exercise no reducing or oxydizing action, but when concentrated or assisted by heat, they only decompose the supposed yellow constituent of the dye. Lo-kao is dissolved in concentrated hydrochloric acid, and produces a green gelatinous fluid; after some hours the coagulated part becomes grey, the liquid above being yellow. When this sediment is washed, and neutralised by ammonia, the green colour is not restored, but a blue or violet is produced.

The colour is destroyed by the oxidising acids. If exposed with caution to the action of these acids, the green colour changes first into red, and then into light rose-colour. The red colour appears equally by the action of the deoxidising acids, sulphurous acid, arsenious acid, oxalic acid, and formic acid. Hydrosulphuric acid changes the colour into blood-red; this colour vanishes as the hydrosulphuric acid becomes decomposed by the influence of the atmosphere, and then the original green colour is restored.

With concentrated sulphuric acid it forms a wine-coloured solution, which is decomposed by water. From the sediment, however, the original green substance cannot be reproduced.

The caustic alkalies appear to dissolve it, but by a

long-continued action, or by boiling, the colour is changed into brown, applicable for dyeing cotton, by the aid of alum or a salt of tin. The same reaction follows when it is boiled with lime-water, or the carbonates and sulphates of the alkalies. Sulphide of ammonium has a specific reaction, changing the colour into red, as is mentioned above.

The Lo-kao, after soaking in water, becomes very soluble in warm solutions of soda or borax. These solutions can be employed to dye cotton cloth directly. Soap made with soda dissolves it very easily. A solution of soda-soap, containing from five to six parts per 1,000 of water, dissolves it, with the aid of heat, and forms a perfect dyeing-liquid for cotton.

Chloride of zinc and chloride of magnesium change the colour into pure blue, resembling indigo blue on cotton. The salts of alumina give to the colour rather a bluish tinge. The salts of tin change the colour into blood-red. This colour is the best for dyeing silk, because, after saturation with an acetic alkali-salt, and exposure to the atmosphere, the green colour re-appears. In this case, much attention is to be fixed on the degree of concentration of the salt.

In every case it is necessary, for uniform dyeing and printing by Lo-kao, that it should be freed from earthy constituents. The best way of doing this is given by M. Persoz. The soaked Lo-kao is dissolved in a concentrated solution of carbonate of potash. After having separated the sediment, the liquid is diluted, and then from this the green colouring matter will fall down. The Lo-kao can likewise be dissolved in 1½ part of acetic acid, diluted by 5 of water; this is properly the clearing from the combination with lime. After filtration, the liquid is neutralised by ammonia, and the Lo-kao subsides in a pure state. For further details, the admirable work of M. Natalis Rondot may be consulted. I will only add that, for printing, the Lo-kao is diluted with a solution of gum, alum, acetate of alumina, &c.

It would be of great importance to ascertain whether there are any European plants containing the principles for a colouring matter resembling the Lo-kao. Since it was decided that the Chinese prepare it from two sorts of the genus *Rhamnus*, the way was opened for making experiments with European species, such as *R. alaternus*, *frangula*, *catharticus*, *hybridus*, *alpinus*. M. Michel, at Lyons, succeeded in treating cotton cloth with the extract of the *R. catharticus*, especially by spreading it at night, and taking it up every morning before sunshine, which, when repeated several times, produced a green colour on one side very much resembling the Lo-kao.

The genus *Rhamnus* was long since mentioned as producing green and yellow colours. The *vert de vessie* is prepared from the unripe fruit of *R. catharticus*; the Persian berries from *R. saxatilis*; the *grains d'avignon*, or yellow berries, from *R. infectorius*. A green or yellowish green can be dyed with the foliage of the black alder tree (*R. frangula*). It is very remarkable that the wood of the *R. alaternus* can be employed for blues; and hence appears the possibility that, by mixing it with the yellow that can be extracted from the bark of another kind of *Rhamnus*, a green colour may be procured. In that way it could be explained why the Chinese employ two different sorts of the same genus of plant. Very much, however, depends on the climate and season. In Sweden, where the *R. frangula* is employed for dyeing woollen cloth, the bark is separated from the plants and dried. The fruit of the same plant gives a yellow colour before ripening in July and August, but in September and October, after ripening, a blue-purple, green, or blue, varying with the composition employed as a mordant.

We may now conclude that the problem, how the Lo-kao is prepared, is not entirely solved, but there is no doubt that the scientific investigations made in Europe will soon supply this want. We are indebted to Mr. Natalis Rondot for having drawn the attention of European manufacturers to some other vegetable colours used by the Chinese dyer.

In the first place may be mentioned the Hoang-tsji or Wong-shi. Hoang or Wong signifies yellow, and hence it is the yellow colouring matter of the Tsji. It is called by the Germans *Chinesische gelbschoten*. It is, in fact, the berries of *Gardenia*, which appear to be capsules filled up with brown-coloured, very hard grains or seed in a yellow pulp; the yellow colouring matter is combined with the vegetable jelly of the pulp. By soaking in cold water a very pure yellow colour is produced, that can be fixed on cotton cloth without the use of a mordant. The colour is not attacked by alkalies or acids, with the exception of nitric acid.

In September, 1857, the Chamber of Commerce of Lyons bought a quantity of 22½ kilogramme from Prof. Th. Martius, at Erlangen, paying 3s. 4d. per kilogramme. In January, 1858, M. Rondot received 2½ kilogrammes from MM. Remy, Schmidt, and Co., at Shang-hai.

There are three sorts: the largest fruits from the *Gardenia grandiflora* (Lour). This Hoang-tsji is called by Mr. Hanbury, Tsji-tse, and is the same as that sold by Prof. Martius. It is mentioned by Kaempfer.

Another sort of better quality is in egg-shaped fruits, the *Gardenia florida* (Lour). Mr. Hanbury calls this *Sjan-tsji*. The third sort is the smallest, nearly globular. It is not determined whether it originates from *G. florida* or *radicans*. The same sorts of plants are very common in Java, where the name is *Katja-piering*, and also in the other islands of the Archipelago. In Java it is only an ornamental flower, because, owing to the high temperature, the fruit is not developed. In the higher districts like Tjipannas, at 3,400 feet above the sea, the fruit can be largely collected. The Chinese species of *Gardenia* was introduced and cultivated at Java at the same time that the culture of tea was undertaken, because the colour was employed in China for colouring the tea chests. At that time it was not generally known that the plant is a native of these islands. I hope shortly to receive the fruit from Java for a comparative examination.

At Sumatra, our celebrated botanist, Mr. Teysman, has detected another species, *G. glutinosa*, whose fruits give an equally beautiful yellow colour. Samples of this sort will be likewise forwarded for trial.

The other vegetable yellows of the Chinese are, *Hoang-tang*, probably the root of *Menispermum cocculus*, or Indian berries, or *Fibraurea tinctoria* (Lour.) *Hoang-tsji* or Saffower, from *Carthamus tinctorius*; *Hoang-pe-mou*, or bark of *Pterocarpus flavus* (Lour.) *Ti-hoang*, the root of *Rhamnesia sinensis*; *Kiang-hoang*, the root of *Curcuma longa*, the *Turmeric*; the Hwae-hwa, Hoai-hoa, Wei-fa, or the non-developed flowers of *Sophora japonica*, as already mentioned. It is sold in China at 5d. or 6d. the kilogramme. It is well-known that it is employed for dyeing green with Lo-kao, or alone for producing yellow. Mr. Meadows asserts that, by a process kept secret in the province of Canton, the Hwae-hwa is employed to dye cotton and silk green, without mixing or grounding with blue, but this requires confirmation. It was stated by Mr. Sinclair that at Emoei there exists an establishment for dyeing cotton green, but the process is unknown. At Tjang-tjsoe-foe it is said to be employed for dyeing silk green. This material is called at Canton Oee-fa; Ningpo, Wae-hoei; Emoei, Hoeae-ho. It was, in 1851, exhibited as Whi-mu.

The plants producing a blue colour are called by the Chinese Lan. Such are several sorts of the genus *Polygonuses* and the *Ruellia indigotica* of Tsje Kiang. The indigo of the southern provinces is prepared from *Isatis indigotica*. From the same genus the Woad is procured. The Dutch embassadors sent to Pekin nearly two hundred years ago, P. de Goyer, and Jacob de Keyzer, make mention of the blue dyeing with the *Tyen-wha* or *Tien-hoa* of the *Idatis*.

The indigo of the *Indigofera* bears the name of *Thoe-tien* or *Tsja-lan*.

PERIODICAL EXHIBITIONS.

The following article is extracted from the *Standard*:—

"After all the agriculturists take the lead of the manufacturers. They have their special society and their annual meeting to furnish a record of progress. The Society of Arts cannot match this. It is very good in its way, but merely scientific and artistic in character. It wants the practical stamp of a simple exponent of manufactures, and does not pretend to it. It reflects no small credit on the agricultural body that they are a pace in advance in this matter. They have an association to look to the improvements of the year, to collect them, to exhibit them, to encourage them, to reward them. The British Association for the Advancement of Science has no such advantage. Admirable as is this institute it only takes note of the more prominent improvements or experiments in physical or abstract science. The meetings have a touch of the dilettantism in them, and can scarcely be considered as practical. Now, the characteristic of the Agricultural Society is its eminent practicability. In truth, if not matter-of-fact and real, the proceedings of the association are worth nothing. A scientific plough that will not do its work will soon be discarded; and a lean bullock, though fed according to the nicest rules of cattle dietetics, would be altogether inadmissable. It is something, therefore, for the farmer to say that he alone has a Great Exhibition every year. And if he intended to boast, he could point to numerous shows which can only be regarded as offshoots from the parent society. In fact, the whole range of farming is now becoming a matter of public competition and enterprise, and has its local and class divisions rivalling one another, and in some instances eclipsing the great annual gathering. Baker-street, Birmingham, and the Crystal Palace are important exhibitions in themselves, and the auctions for sale or hire of cattle are made objects of general interest and universal commercial speculation. On these occasions we find American bidders, Australian bidders, French bidders, and German and Spanish bidders; and these for the most part the representatives of distinguished personages or great companies in their own country. Even in horticulture there is the same advance. In addition to our numerous general flower shows and floricultural societies we have associations for the improvement of the growth of roses, of dahlias, of chrysanthemums, &c. The manufacturing world, with all its vaunting, can show no such sign of enlightenment and advancement. Where are our linen shows? Our cotton shows? Our woollen shows? Or our silk shows? These, in their various departments, might be made not only attractive to the public, but highly instructive to all concerned in the trades. Then, surely the machinery in connection with them could not be exhibited without producing the very best effect on the march of invention. The field of our manufactures is comprehensive and vast; but, with the exception of a few stray lectures and casual expositions, it has no public recognition and display like those in operation within the more limited area of agriculture. Alderman Mechi as a manufacturer or tradesman was of small importance, but as the Tiptree farmer he is a foremost man. The same may be said of other gentlemen in a similar position. They had to go to the country for their honours. The great objection made by the manufacturers to exhibitions is their expense. Long-cloth cannot afford the cost which Broad-acres cheerfully incurs. Everybody knows that it is only by immense skill and exertion that any of our annual shows are made to pay. Then there is not only much private munificence, but also large private loss and sacrifice. But this is the story of our progress—we conquer through loss. All victory is made up of the same individual damage and self-denial. There are very few exhibitors at our cattle shows who are not out of pocket, and no farmer goes thither for the purpose of making money. It is rather his custom to put a few pounds in his purse, and resolve to spend it bravely on this special occasion. He has his pride of class about him, and he, too, wishes to show handsomely. Our manufacturers boast of great wealth and unlimited enterprise. We only wish, for the common good of the country, that they would just take a lesson of patriotism and liberality from these stupid Conservative farmers.

"But even with respect to the agriculturists, one naturally asks the question, is all this competition and public display for the public good? Is meat better and cheaper now than it used to be? Can the same be said of grain, fruits, and vegetables? Shall we really set to plough by steam and to farm by machinery? We answer all these questions in the affirmative. The improvement of breed must introduce a better quality of flesh; superior attention to the growth of corn, garden products, &c., must and does enhance their goodness. Whether all the classes of engines and implements experimented upon will be ultimately employed in agriculture is a wider problem. But it is one that admits of a limited answer. The nature of the trial must necessarily lead to closer calculation and observation, and therefore to improvement. Moreover, many of these new instruments are now in general use, and will in time become universal. The material and national good then is pretty apparent; but there is a vast moral advantage underlying all these exhibitions. They encourage talent and diffuse kindly fellowship and feeling among men of different classes. The prince and the peer, the engineer and the farmer, are all members. They meet together on the same ground. They frequently intermingle and shake hands in friendly conversation, and the humbler man is often the winner of the prize, being thus far the superior for the time. Then these great exhibition folk do not do all the grazing or growing work themselves. Their subordinates are the main instruments, the real operatives. In this way, *Mr.* Smith, the bailiff, or *Mr.* Jones, the gardener, is a great man, and he feels his importance and has it acknowledged ever afterwards. Even a ploughing match makes a hero of the successful clodhopper for the time, and thus raises him in self-respect and intelligence into a man. There are no composing matches among compositors, or printing matches among machinists, or weaving matches among weavers. In fact the entire manufacturing tribe ignore emulation and competition among their workmen, and stimulate them only on a sordid principle of hire. The country is far in advance of the town in all these matters and indicates a higher civilisation. It must on all hands be admitted, too, that the success of our agricultural associations greatly depend on the part the aristocracy take in them. The very order which Mr. Bright and his imitators seek to defame are the mainstays of this progressive movement in the nation. Expunge the list of peers and great landed gentry from the list of supporters and exhibitors in these societies, and you reduce them to a mere skeleton, without sinew or substance. It ought to be remembered, too, that these shows are signal peace makers. Men of all nations intermingle here in fellowship. Only war or something like it, can call them away from the friendly competition. It was a matter of remark the other day that Napoleon III. was not, as usual, represented at an auction for the hire of bulls, but at the same sale men of nearly every country were present, and gave animation to the spectacle. It is just the same with our exhibitions. We must, then, in common sense and fairness, send the peace-at-any-price men to our agricultural shows, and bid them take a leaf from the farmers' book, if they wish to exterminate war from the catalogue of human calamities. A fat ox and a ploughshare are good emblems of peace. We recommend Mr. Bright to become an active member of the Birmingham cattle show."

[The writer of the above article appears not to be aware that previously to the establishment of the Royal Agricultural Society, and at a period when no other

public body was occupied with the subject, the Society of Arts devoted much attention to the progress of Agriculture, and awarded premiums for improvements in it. The early volumes of its Transactions show how much the Society laboured to promote the advancement of Agriculture.—[Ed. *S. A. J.*]

CHARRED WOOD.

Rather more than thirty years ago the amateur artistic world was surprised with one of those propositions which so constantly emanate from the active brains of ingenious men. The subject referred to is that of poker-drawing. In the hands of the able professor who brought it forward, the results obtained by its means were not only satisfactory, but showed that considerable artistic effects were capable of being produced readily by means and with materials hitherto unused by the artist. Poker-drawing, in short, became a fashionable pastime with ladies and amateur artists. The world looked at its effects and wondered; while commercial men passed it by as a thing of little value to them. Poker-drawing, burnt-wood drawing, and smoke-drawing, each had its day, and having amused for a time, was, like a child's toy, soon thrown aside and forgotten. There are, however, principles involved in each of the processes which many would do well to bear in mind, especially those whose future life may lead them into positions where, desiring to record their ideas, or to enable others to work them out, they may be unable to obtain readily the ordinary appliances used in drawing. A workman in the back woods of Australia, with a red-hot nail and a piece of wood, may record his plan for constructing some new or modified tool; or upon a bit of wood charred on its surface may, with his pocket-knife, by scraping away portions of the charred surface, execute his sketches, and record the scenes through which he passes, in a manner both easy, artistic, and durable. The object in now alluding to the above, is to call attention to the modified form in which burnt wood is at the present time introduced commercially as an article of trade. The principle of burning wood by means of dies, is not new, for the Burnt-wood Carving Company produced many beautiful works in relief; had the process, however, employed by them been an economic one, or capable of easy working, it would not have been given up after the large sums which were invested by it in the production of dies.

The modified form in which burnt wood is now again introduced, for commercial purposes, is that of charring the surface only by means of engraved cylinders, heated with gas, which enables the degree of heat to be regulated and the extent of the char to be controlled. The object is not to produce designs in relief, but in light and shadow upon a perfectly flat surface. This is now being done by Mr. Brigg, both artistically and economically. By this means he produces ornamental pannels and imitations of the more costly woods. After the surface has been charred sufficiently to yield the greatest amount of shadow required, the whole surface is rubbed or scraped down to a flat surface, which is then polished or varnished. By this means imitation-grained surfaces are obtained of great durability, and at a cost not exceeding that of grained work produced by the ordinary process of painting and varnishing. Specimens produced by this process were exhibited for a few days at the Society's Rooms, towards the close of the late Exhibition of Patented Inventions, but were received too late for insertion in the Society's Catalogue, and it may be of interest to the members to direct attention to the process.

AID TO SCIENCE-INSTRUCTION.

The following Minute has been recently passed by the Committee of Council on Education :—

"My Lords proceed to revise the Minutes which have been passed in the Science and Art Department for the encouragement of scientific instruction among the industrial classes of this country who have already received primary education.

"I. All former minutes relating to science or trade-schools, and scientific class instruction, except those referring to navigation, public lectures, and the training of teachers (as hereafter appended), are hereby cancelled, and the following regulations are substituted in their place.

"II. The Science and Art Department will hereafter assist the industrial classes of this country in supplying themselves with instruction in the rudiments of—

1. Practical and Descriptive Geometry, with Mechanical and Machine Drawing, and Building Construction;
2. Physics;
3. Chemistry;
4. Geology and Mineralogy (applied to Mining);
5. Natural History;

by augmentation grants in aid of salary to competent teachers, and by payments and prizes on successful results, and grants for apparatus, &c.

"III. Any school or science class, either existing or about to be established, and duly approved by the Science and Art Department, may apply, through its managers, for a certificated teacher, or for the certification of any teacher, in any one or more of the above-named branches of science.

"IV. Examinations for certificates of three grades of competency, to teach any of the above-named sciences, will be held annually by the Department, in the last week of November, in the metropolis, as follows:—

"Nos. 1, 2, and 5, at South Kensington.

"No. 3, at the Royal College of Chemistry, Oxford-street.

"No. 4, at the School of Mines, Jermyn-street.

"V. Annual grants, in augmentation of salaries of teachers so certified to teach in any of the above-mentioned sciences, will be given as follows:—

"For the 1st grade of competency, £20.
" 2nd " " £15.
" 3rd " " £10.

"Any teacher holding a certificate of competency to give primary instruction will receive, from the Science and Art Department, a sum equal to the augmentation grant which has been attached to such certificate, in addition to the grants above mentioned.

"VI. Such grants will only be made while the teacher is giving instruction in a school or science class for the industrial classes, approved by the Department.

"VII. The Department will require that suitable premises shall be found and maintained at the cost of the locality where the school or class is held; that the names of ten students shall be entered whose fees for half a year shall have been paid in advance; and that the local managers shall guarantee, for the support of the schools and teachers, from fees or local funds, a sum at least equal to the grants so long as they shall be paid. If at any time neither fees of pupils nor local funds cover the requisite amount, it must be inferred that there is no demand for instruction in the above-named sciences in that locality which the Government is justified in aiding, and the assistance of the Department will be withdrawn.

"VIII. Every school or class having a certificated teacher will be inspected and examined once a year by the department, and Queen's prizes of an honorary kind will be awarded to successful students.

"IX. Payments will be made to the teacher on each first-class Queen's prize obtained by the student, £3; on each second-class, £2; and on each third-class, £1.

"X. A grant towards the purchase of apparatus, fittings, diagrams, &c., of 50 per cent. on the cost of them, will continue to be afforded to schools and classes in Mechanics' and similar Institutions.

AMERICAN STEAM FIRE-ENGINE.

The *Scientific American* states that one of the newly-constructed locomotive steam fire-engines lately ran twenty miles on a common road. The whole weight of the engine, water, and nine passengers, was 12,000 lbs., 9,000 lbs. being the weight of the engine alone. The first three miles were made in sixteen minutes running time, and it went over a bridge 350 feet long, with a draw of 40 feet in the centre, and up a very heavy grade, making 1,000 feet in exactly one minute. The time occupied in travelling the twenty miles was two hours, grades and all included.

AN AMERICAN HOTEL.

The *New York Journal of Commerce* states that the new Fifth-avenue Hotel in New York covers sixteen "lots" of ground, is seven stories high, and has an elevation, from the cellar to the roof, of 107 feet. The front, on Fifth-avenue and Broadway, is 202 feet; on Twenty-third-street, 215 feet; and on Twenty-fourth-street, 196 feet. The main entrance is on the Fifth-avenue. On the right of this is the grand stairway, opening from the hall, and on the left is the business-office. In the rear of the main floor is situated the billiard and chess-rooms on the one side, and the gentlemen's exchange and reading-room on the other. There will also be attached to the house a Parisian restaurant, not only for the guests, but as a place where other gentlemen and ladies may dine with their families or friends, genteelly and economically.

On the second floor are the public and private parlours, opening into a corridor 613 feet long, running the entire length of the building. At the end of this corridor is the grand promenade, nearly 30 feet wide, uniting with the grand dining-hall at its western extremity, and presenting, with its double rows of columns, a magnificent *tout-ensemble*. The grand dining-hall is 80 feet long, 60 feet wide, and 21 feet high, lighted with elegant chandeliers hung from a frescoed ceiling supported by Corinthian columns. Between the latter, on one side, are placed magnificent mirrors; while, between the same, on the other, are placed beautiful French buffets.

The house contains eight large public parlours, 120 private ditto, four dining and tea rooms, 420 chambers, and other rooms for servants, &c. Nearly all of the principal chambers have baths and water arrangements complete, there being fully 100 baths in all.

To facilitate communication between the several storeys, there is provided a luxurious car, or ladies' carriage, which is capable of seating ten persons, and is caused to glide from the lowest floor to the uppermost storey; this car is propelled by steam power, passes up a revolving spiral shaft near 100 feet in height, and is provided with a most efficient hydraulic device for ensuring the safety of persons within it, in case of the breaking of any of the hoisting tackle.

The whole building will be supplied with an independent gas apparatus, costing about 6,000 dollars, by which the expense of illumination, as already proved in actual service, is reduced one-half in comparison with the city charges. The gasometer for the Fifth-avenue Hotel holds 63,000 cubic feet, and will supply 3,000 burners. Iron tanks are used instead of the ordinary cisterns.

The plan of ventilation is very effectual, the heat of the furnaces being conducted into flues extending over the house, thereby creating a strong draught, and exhausting the atmospheric impurities of the various apartments.

The building is heated by steam, for which three boilers, each 22 feet in length, and nearly 5 feet in diameter, are provided. From these the steam is conducted by pipes, all over the building, condense steam being carried back to the boilers by a return flue. The boiler and gas-house occupy a distinct building wholly detached separate from the main structure.

Among other novel and curious kitchen apparatus are ten monstrous steam-kettles, each weighing nearly 1,000 lbs., for boiling vegetables, &c. All the various machinery for cooking, washing, ironing, and other processes, is in a building specially constructed, and of sufficent capacity to supply the wants of 1,000 guests.

The entire cost of this establishment will exceed one million dollars.

Colonial Correspondence.

BRITISH HONDURAS.

SIR,—I forward to you a prospectus of a "Society of Arts, Agriculture, and Commerce," which we are desirous of establishing in Belize, and I shall feel obliged if you will publish it in your *Journal*.*

This society, I hope and believe, will be productive of great benefit to the colony, and will be the means, I trust, of bringing to the notice of the British public the infinite variety of its resources. It will also, I have little doubt, be instrumental in improving the minds of the colonists. We propose to have likewise a Botanical Garden, in which we shall bring together every description of tree, shrub, and plant which grows in the country. We shall place in it all the palms,—the Palma Real, or Royal Palm,—called here the mountain cabbage—the Cahoun Palm, the Super Palm, and the Cocoa-nut Palm. We shall plant in it the different kinds of cotton—the Sea Island, the Clustered Seed, and the Anguilla. We shall plant in it mahogany, cedar, logwood, pitch pine, white pine, sapodilla, Billy Webb wood, the wild cotton tree, the weed fig tree, black mangrove, red mangrove, brazilletto, fustic, calabash, iron wood, bullet tree, dogwood, ramoon, rosewood, moho, oak, axe-cuagtec, and Santa Maria. We shall grow in it the coffee tree, cacao, tobacco, sarsaparilla, ipecachuano. We shall place in it the mango, the orange, the shaddock, the forbidden fruit, the rose apple, the star apple, the pine apple, the guava, the pomegranate, the sour sop, the sweet sop, the granadilla, the tamarind, the lemon, the lime, the papaw, the melon, the Otaheite gooseberry, the mammee, the naseberry, the wild cherry, the bread fruit, the almond tree, the fig tree, and the kenepp. We shall cultivate the yam, the yampa, the plantain, the banana, Indian corn, sweet potatoes, okro, cho-cho, pumpkin, cassava, Indian kale, calslue, and the garden egg. The above are a few of the native trees, plants, and fruits of Honduras. There are many others to mention which would occupy too large a space; but all will be brought into the garden which we have in contemplation. But we do not intend to confine ourselves to those vegetable products which belong properly to this country. We shall introduce into our garden as many aliens as the climate will permit. We indulge a sanguine hope that, by means of the Society we project, by means of our museum, our reading room, our lectures, and our botanical garden, we shall elevate and refine the taste of the people, and develop the resources of the country.

The British commercial public are beginning at length to direct their attention to Honduras. The prospectus of a company, to be called "The British Honduras Company," has just been published in London. The trustee is Samuel Gurney, Esq.; the bankers, Barnett, Hoare and Co.; and the solicitors, the highly respectable firm of Messrs. Martin, Thomas, and Hollams. These names are sufficient guarantees to the public for the *bona fides* of the promoters, and the legitimacy of the undertaking. The capital of the company is to be £100,000, in 20,000 shares of £5 each. The prospectus states:—

"This company is formed under the Joint Stock Com-

* See *Journal*, present Vol., p. 345.

pany's Act, for the purposes of cutting and importing into this country, mahogany, logwood, and other products of British Honduras; and for conducting the usual operations connected therewith; and for buying, selling, exchanging and letting lands, and affording facilities for settlers thereon."

There are two features in this proposed company to which I object.

First, the capital is far too small. Instead of £100,000, the capital ought to be a million, or £500,000, at the least. It must be borne in mind that the land, although most fertile, is, with some few exceptions, covered with forests. These must be cut down and burnt before anything can be done. For this purpose a large supply of labour will be instantly requisite. One or two thousand Indian coolies, with their wives and families, must be immediately imported. I say Indian coolies, not Chinese. I hope not one of that debased race will ever be permitted to plant his foot upon these shores. The Chinaman, in my opinion, is the very worst labourer that could be imported into the country. Granted that he is intelligent, industrious, and hardy. These qualities—no doubt very desirable—are no compensation for his beastly propensities, for his incorrigible addiction to the most horrible of vices. Besides, he would not stay in the country. After he had hoarded a little money, away he would speed to his tea-gardens, his dog-feasts, and his flat-nosed, angular-eyed, small-toed beauties. I say, their wives and families. I am convinced that no importation of labourers which does not include females as well as males, will be followed by good results. In addition to the importation of labour, there will be the purchase of working cattle, of agricultural instruments, of steam-ploughs, of boats to carry produce to the place of shipment, the erection of sugar-mills, oil-presses, cotton-gins, the wages of clerks and managers, and a thousand other incidental expenses. All these will require a very large outlay, and £100,000 would be like a drop in the bucket.

Secondly, I object to the combining with agricultural operations, the cutting of mahogany and logwood. The demand for those articles must always be very limited, and the supply must be kept a little under that demand to insure anything like a profitable return to those who are engaged in the trade. For the last ten years, the mahogany trade has not been a very remunerative business. Four large houses have been engaged in it, and two of them have failed. If it be the wish of the Company to cut up and totally destroy this trade, let them engage in it. But if they are desirous that those who are now pursuing it should prosper, and, by means of their prosperity, be able to render them valuable assistance, let them at once abandon their intention of cutting and importing mahogany. You cannot serve two masters. You cannot with success pursue agriculture and the mahogany trade at the same time. Cutting mahogany and cultivating sugar are as opposite to each other as are the north and south poles. They cannot amalgamate. The two pursuits will require different classes of labourers. To cut mahogany, you must have the big, muscular, brawny African. To till the land, you must have the light, limber, agile Hindoo. The Hindoo and the negro will never agree. If the company, then, are wise, they will, instead of cutting mahogany themselves, dispose of the growing timber to the mahogany houses which have survived the tempest, which have ridden out the storm. There is a wide enough field for them without engaging in a ruinous competition in a trade which can only be carried on, with profit, to a very limited extent. Sugar, rum, cotton, coffee, oils, tobacco, fibres, &c., will sufficiently engage their attention, and the trade in those articles cannot be pushed too far.

The sugar cultivation in Honduras is increasing, and, what, is more, is paying. During the last year, Mr. Alexander shipped to New York 80 barrels of sugar, and to New Orleans 83 barrels, amounting to about 50,000 lbs. He is now waiting for an opportunity to ship the same quantity to England. About a fortnight ago, Messrs. Guild and Co. shipped to New York 80 barrels, weighing 25,000 lbs. These facts speak for themselves.

In my reply to the letter which I received from Detroit, relating to immigration to Honduras, which you kindly published in your *Journal* of the 26th of November, the printer erroneously makes me say, "one planting of the cane will last *three* years." This is a mistake. It ought to be *twelve* years. In point of fact, in some parts of British Honduras you may go on ratooning for 15 and 16 years. In what other part of the West Indies can this be done? Nowhere. Even in Antigua, one of the most flourishing of the West India islands, they can only ratoon one year, and that only with the aid of the most expensive manure.

A specimen of cotton was brought to me a few days ago, grown by Mr. Kohr, a German gardener. It is the clustered seed cotton, and a gentleman, well acquainted with the subject, informs me that it is very superior to the cotton of the United States. When the seed of the cotton tree is planted in this country, it arrives at maturity in nine months. It then bears a crop consisting of a pound and a half of cotton; after that it will give a crop every three months, whilst the tree lasts, equally good in quality, but less in quantity. The tree, which grows to the height of nine or ten feet, continues in full bearing for three years, and gives a crop of 3lbs. in each year. Is the Manchester Chamber of Commerce indifferent to these facts? I have mentioned Mr. Kohr. Let me say a word or two about that gentleman. He came from Germany, several years ago, with Baron Bulow, to form one of the Belgian settlement of Sante Tomas. It is well known that that project failed. Mr. Kohr then came to Belize. He had not one farthing of money, but he had skill, honesty, temperate habits, health, youth, industry, and an indomitable spirit. He purchased of a gentleman, on credit, a tract of land seven miles in length, and about the same in breadth. The price was £212. In two years he paid the purchase money, which by the sweat of his brow and the labour of his hands he had extracted from the soil. A great portion of his land is now under cultivation. He supplies the Belize market with vegetables of all kinds, and the various fruits of the country, by which he makes an income of from £500 to £600 per annum. He has largely planted his estate with mango, cocoa nut, and orange trees. In eight or ten years he will have 20,000 cocoa nut trees, and 10,000 orange trees in full bearing. The annual value of a cocoa nut tree is two dollars; that of an orange tree five dollars. In ten years, then, Mr. Kohr will receive, from these two sources alone, 90,000 dollars, or £18,000 per annum! Some of your readers may think that this statement sounds very much like one of Major Longbow's astounding stories, and that it ought to have concluded with "Upon my soul it's true—what will you lay it's a lie." But without having recourse to the strong language of that ingenious narrator, or my Lord Petre's convincing arguments, to prove the truth of my story, I can assure that what I have related is a fact. If the wise Solomon had lived in Belize, he would not have said to the indolent and the sleepy-headed, "Go to the ant, thou sluggard;" but he would have said, "Go to Godfrey Kohr, the German; learn of him, and be industrious." Let the British Honduras Company turn their attention to the cultivation of cotton, sugar, oil, and tobacco, and they may depend upon it that those articles will afford them much more profitable returns than peddling and flirting with mahogany. If the company persist in combining mahogany cutting with their other operations, they will commit a grievous error. But, as the Scotch say, "He that will to Cupar maun to Cupar." I have given them my disinterested advice; there are others who from selfish motives will probably speak differently. Let me warn the company that there are men who, although they may have passed their 14th lustrum, and can shake their heads

as wisely as Lord Burleigh, are yet capable of giving a fool's council. I am, &c.,

R. TEMPLE.

P. Le Neve Foster, Esq.

Home Correspondence.

ELECTRO-DEPOSITS FOR ENGRAVED COPPER-PLATES.

SIR,—I have been much interested by several letters that have recently appeared in your *Journal* on electro-deposits for engraved copper-plates, and having lately had an opportunity of comparing the results of the two processes—iron and zinc—I would offer a few remarks to show the superiority of the first process over the zinc coating. Mr. Bradbury himself tells us that the iron facing has yielded from 1,000 to 9,000 impressions. I have seen a printer's letter which gives the average of iron facing at 7,000 for a number of plates similar in size and subject to those upon which Mr. Bradbury bases his calculations in his communication to you in the last week's *Journal*, namely, Bank-note plates. I would point out to Mr. Bradbury that, between the zinc facing at one farthing per inch for small plates (cost price) and the iron deposit as per charges published by Mr. Joubert, there is not that "material difference" that he has stated, for in that scale of charges, which is now before me, two pence per inch is the price for small plates, and, considering their capabilities when prepared by Mr. Joubert of yielding four times as many impressions, at least, as can be obtained from the zinc—the maximum being stated at 2,000—I think I can show a vast discrepancy between Mr. Bradbury's calculations and the plain facts. As to nickel, I have not seen any deposit of that metal, but if, as acknowledged both by Mr. Joubert and Mr. Bradbury, there would be any danger of injury to the plate, unless "certain precautions" were adopted—suppose some mistake or omission made in applying certain preparations—in such a case as that of a large copper-plate which I saw a short time since prepared by Mr. Joubert's process, and for which the publisher had paid £5,000, who would bear the loss?—for money alone could not repair the mischief.

I submit this to Mr. Bradbury.

I am, &c.,

F. W. KIRBY, Capt. R.E.

Aug. 2nd, 1859.

Proceedings of Institutions.

DOVER MUSEUM AND PHILOSOPHICAL INSTITUTE.—The twenty-first annual meeting of this Society took place at the Guildhall Rooms, on May 18, W. Sankey, Esq., in the chair. The report of the proceedings of the Society during the past year was read by Mr. A. Phillips, one of the secretaries. It stated that six London newspapers had been daily laid upon the table of the Reading Room during the past year, that the Library had only received an addition of five volumes, but that a monthly supply of books had been received from Messrs. Hookham, of London, and recommended that measures should be taken to increase this important branch of the Institution. There had been, in all, fifteen Lectures during the past Session, four of which were in conjunction with the Working Man's Institute. The Lectures had been well attended, and the proceeds paid the whole of the expenses. The Museum had received but few presentations, but had been visited by nearly 10,000 persons. Owing to deaths, removals from Dover, and other causes, thirty-two members had left the Society since the last annual meeting, but twenty-two had joined it, there was, therefore, a diminution of ten. The total number at present is 130. Mr. Penny, the treasurer, whose accounts had been previously audited, then presented his report of the financial state of the Society. The officers of the Institution were then all unanimously reappointed. The general meeting then resolved itself into a special one to consider the revision of the rules and regulations of the Society, according to a notice given to that effect. Mr. Phillips proceeded to read the report of the committee on that subject, and after a protracted discussion, several gentlemen having requested further time to consider the alterations and revisions proposed before adopting them, the meeting was adjourned. A vote of thanks to the chairman terminated the proceedings. The adjourned special meeting of the Society was held on the 25th of June, W. Sankey, Esq., in the chair. Mr. Phillips opened the business by reading the minutes of the last meeting, and then proceeded to read the rules of the Society with the bye-laws of the Reading-room and Library, as revised by the committee. The rules and bye-laws were approved and passed unanimously. By rule five of the revised rules, the number of Vice-Presidents of the Society being increased from two to four, it became incumbent on the meeting to elect the additional two, this having been done a vote of thanks was passed to the chairman and the meeting broke up.

To Correspondents.

ERRATA.—Page 598, second column, line 54, read:—"In 1838 Schweigger was no longer editor of any journal."

Page 606, second column, line 61, for "on the 13th of March," read "in the beginning of April," and in line 62, for "Opotchinin's" read "Afrosimow's."

Page 607, first column, line 8, read:—"He collected a great many precious Chinese, Thibetan, Mongolian, and other writings."

On same page and column, line 63, for "1835," read "1803.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

PAR. No.

Delivered on 14th July, 1859.

58. Civil Service—Estimates—Class 2 (Corrected pages).
77. Constituencies—Return.
87. Parkhurst Prison—Return.
56. Municipal Rates and Franchise Acts—Lords Report.
42. Bills—Metropolis Gas Regulation.
49. ,, Pawnbrokers.
50. ,, Public Improvements.
51. ,, Imprisonment for Small Debts.
52. ,, Municipal Corporations.
53. ,, Dwellings for Labouring Classes (Ireland).

Delivered on 15th July, 1859.

64. East India (Army)—Return.
75. Bills of Exchange and Promissory Notes.—Return.
54. Bills—Settled Estates Act (1856)—Amendment.

Delivered on 16th and 18th July, 1859.

1. East India (Cabul and Affghanistan)—Papers.
40. Police (Scotland)—Report of the Inspector of Constabulary.
80. Cambridge University (Scholarships at St. John's College)—Two Statutes.
82. Cambridge University—Report of the Commissioners.
93. Foreign Seamen Apprentices—Returns.
79. Cambridge University (Trinity College, &c.)—Copies of Statutes
56. Bills—Cambridge University Commission.
57. ,, Universities (Scotland).
28. ,, Bankruptcy and Insolvency (Ireland) Act Amendment.

Delivered on 19th July, 1859.

66. East India (Public Works, &c.)—Return.
86. Shipowners—Copy of the Supplementary Correspondence.
88. Army (Number of Officers and Men)—Return.
89. Weighing Machines—Return.
91. East India (Salaries, &c.)—Return.

Delivered on 20th July, 1859.

81. East India (New Tariff)—Return.
84. Harbours of Refuge.—Return.
90. East India (Revenues, &c.)—Returns.
22. Chamber of London—Annual Accounts.
95. Mr. H. T. Wrenfordsley—Copy of Memorial.
97. Navy (Ships in Active Service)—Return.
51. Benefices and Ecclesiastical Patronage—Return.
59. Bill—Ecclesiastical Commission.

Indian Army, Re-organisation of—Papers.

PATENT LAW AMENDMENT ACT.

APPLICATION FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, June 29th*, 1859]

Dated 21st June, 1859.

1495. W. Coles Fuller, 2, Bucklersbury, Cheapside—Imp. in india-rubber shackles, and in springs for carriages, and the metal fittings connected therewith.

Dated 23rd June, 1859.

1512. G. C. Grimes, Wandsworth, Surrey—Imp. in cigar or such like lights, and in the means of producing them.

Dated 29th June, 1859.

1546. T. Wright, Middlesborough-on-Tees, Yorkshire—Imp. in the apparatus used in the manufacture of cast metal pipes and castings, termed core bars or spindles and chaplets.

Dated 5th July, 1859.

1595. C. Barlow, 89, Chancery-lane—Imp. in capstans. (A com.)
1596. A. Beaulieu, 25, Rue du Chemin de Fer, Porte de Cologne, Brussels—Imp. in crinolines, and in machinery for manufacturing springs for such and other purposes. (A com.)

Dated 6th July, 1859.

1604. C. Hagan, Tower of London—Imp. in apparatus for curing smoky chimneys, and preventing down draught.
1606. S. Lloyd, Wednesbury, Staffordshire—Imp. in the manufacture of cast steel tyres.

Dated 7th July, 1859.

1616. J. Smith, Norton-street, Cherry-square, New Radford, Nottingham—Imp. in propelling ships and other vessels.

Dated 8th July, 1859.

1624. W. N. Nicholson, Newark-on-Trent—Imp. in machines for making and collecting hay, and for cutting thistles and weeds, which improvements in whole or in part are applicable to other agricultural implements where teeth or tines are used.

Dated 9th July, 1859.

1640. W. Mac Kean, Paisley, Renfrew, Scotland—Imp. in the manufacture or treatment of farinaceous matters for the obtainment of starch and food.

Dated 12th July, 1859.

1651. J. Luis, 1B, Welbeck-street, Cavendish-square — Imitation leather. (A com.)
1655. G. White, Mansfield, Nottingham—Imp. in apparatus for counteracting the effects of collisions in railway trains.

Dated 13th July, 1859.

1657. C. S. Walker and R. Hoyle, Bury—Imp. in machinery or apparatus for promoting the consumption of smoke in steam boiler and other furnaces, and for preventing the explosion of steam boilers.
1658. A. Cooper, Birmingham—Imp. in the manufacture of the grips of swords and sword bayonets.
1659. J. S. Thomson, Kilmarnock, Ayr, N.B.—Imp. in steam engines. (A com.)
1660. W. Cotton, Loughborough, Leicestershire—Imp. in means or apparatus for connecting together or uniting looped fabrics.
1661. J. Combe Belfast—Imp. in machinery for hackling flax and other fibrous substances.
1662. J. Taylor, Roupell-park, Streatham-hill, Surrey—Imp. in stoves and fire-places, and in the arrangement of flues connected therewith.

Dated 14th July, 1859.

1663. W. Walker, Liverpool—Imp. in the manufacture of metallic packages, and in machinery for manufacturing the same. (A com.)
1664. R. Mushet, Coleford, Gloucestershire—Imp. in the manufacture of shot and shell and other projectiles.
1665. R. Mushet, Coleford, Gloucestershire—A new or improved manufacture of certain metallic compounds or alloys.
1666. J. Atkinson, Lancaster—Imp. in fire-arms.
1667. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in the manufacture of artificial fuel. (A com.)
1668. J. Morgan, Manchester—Imp. in apparatus for making candles.
1669. J. Bailey, Manchester—Imp. in machinery or apparatus for stretching woven fabrics.
1670. R. Longstaff, Mornington-road, New Cross, and A. Pullan, Fortie cottage, New Cross—Imp. in traction or locomotive engines.

Dated 15th July, 1859.

1671. C. Kingsford, Seaton, near Wingham, Kent—Imp. in the preparation of peat and charcoal for fuel, in the manufacture of coke therefrom, and in the machinery and apparatus employed for effecting the same.
1672. W. Clark and W. Williams, Manchester—Imp. in finishing woven fabrics.
1673. F. Brown, City Road, Middlesex—The preparation and manufacture of a new fibrous pulp for making paper, and for other useful purposes.
1674. R. Mushet, Coleford, Gloucestershire—New or improved methods of manufacturing a certain metallic compound or alloy.
1675. H. Grand de Chateauneuf, Paris, France—An improved coverlet called zephir-eider-down coverlet.
1676. J. P. Farrar, New York—Imp. in the treatment of iron.
1677. W. McAndrew, 57, King William-street, London, and C. W. Boyd, Sochia, Asia Minor—Imp. in treating poppies to obtain a product resembling opium therefrom.
1678. W. O. Carter, 12, South John street, Liverpool—Imp. in machinery for sawing slate.
1679. F. Prince, 138, New Bond-street, Middlesex—An imp. in breech loading firearms.

Dated 16th July, 1859.

1680. J. Musgrave, jun., Bolton-le-Moors, Lancashire—Imp. in the construction of steam-boilers.
1681. J. Bernard, Albany, Piccadilly, Middlesex—Imp. in the construction and arrangement of hyraulic and other pumps, for forcing liquids and for obtaining pressure.
1683. C. Pottinger, Anstruther, Fife, N.B.—Imp. in machinery and apparatus for dredging or excavating, and for driving piles.
1684. H. Cunnew, Triangle, Hackney, Middlesex—Imp. in elastic bands.
1685. P. A. A. Trouttet, Dijon, France—A new moveable stopper for gaseous liquids.
1687. W. M. Smith, Northampton—The construction of fare-boxes, for the prevention of fraud on the part of drivers, conductors, &c. (A com.)
1688. M. H. Chapin, Boston, U.S.—Imp. in the manufacture of galloons, tapes, or ribbons for supporting steel or other hoops used for distending ladies' dresses.
1689. T. Carlicll, Union-street, Portsea—Imp. in vent-pegs.

Dated July 18th, 1859.

1691. J. Bernard, Albany, Piccadilly, Middlesex—Imp. in the manufacture of boots and shoes, and the means employed therein.
1692. H. C. M. Cramer, Paris—Imp. in bedsteads.
1693. J. Shaw, Teignmouth—Imp. in the manufacture of artificial fuel.
1694. A. Phillips, Glasgow—Imp. in weaving carpets, and in the machinery or apparatus to be used therein, parts of which machinery or apparatus are applicable to the weaving of other fabrics.
1695. W. H. Harfield, Fenchurch-street—Imp. in apparatus employed in getting ships' anchors and in shackling chains.
1696. W. E. Newton, 66, Chancery-lane—Imp. in the method of constructing and operating batteries for generating or exciting, by chemical action, electricity for telegraphic purposes. (A com.)
1697. A. V. Newton, 66, Chancery-lane—Imp. in the manufacture of india-rubber, and other like fabrics. (A com.)

Dated 19th July, 1859.

1699. F. C. Bakewell, 6, Haverstock-terrace, Hampstead—Imp. in extracting oils from coal and other minerals. (A com.)
1700. J. Shanks, of Arbroath, Forfar, N.B.—Imp. in mowing machines.
1701. H. Parent, Roubaix, France—Imp. in or applicable to looms for weaving.

Dated 20th July, 1859.

1703. J. Erskine, Newton Stewart, N.B.—Imp. in breech-loading firearms.
1705. W. E. Gedge, Wellington-street South, Strand—Improved apparatus for the prevention of accidents in mines, to be called a mining parachute. (A com.)
1707. Right Hon. J. Earl of Caithness, Hill-street, Middlesex—Imp. in the permanent way of railways.
1709. W. E. Newton, 66, Chancery-lane—Imp. in self-acting lithographic printing machines. (A com.)

WEEKLY LIST OF PATENTS SEALED.

[*From Gazette, July 29th*, 1859.]

July 29th.

283. S. B. Eveleigh.
284. R. Needham.
290. G. A. Waller.
296. E. E. Allen.
304. J. Hirst and J. Hollingworth.
305. G. Leach.
357. A. Clark.
427. R. Cookson and C. W. Homer.
489. A. W. Smethurst.
745. P. P. Boll and H. Reger.
1317. R. Samuelson.

[*From Gazette August 2nd*, 1859.]

August 2nd.

309. W. Clayton and J. Goodfellow.
311. J. Petrie and T. Wrigley.
317. A. Allan.
320. R. A. Brooman.
322. G. H. Baylis and F. Robinson.
323. F. H. Maberly.
332. N. Greenhalgh, W. Shaw, and J. Mallison.
335. T. Sykes and B. C. Sykes.
347. J. Wilson.
393. G. Hadwen and J. Wadsworth.
398. S. H. Huntly.
418. R. Mushet.
443. H. Y. D. Scott.
445. P. E. Fraissinet.
442. J. H. Johnson.
458. P. A. J. Dujardin.
596. P. E. Aimont.
1143. W. S. Booth.
1431. W. Brown and S. Bathgate

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, July 29th*, 1859.]

July 26th.

1820. W. Wood and M. Smith.
1821. W. Wood and M. Smith.

[*From Gazette, August 2nd*, 1859.]

July 28th.

1809. W. E. Newton.
2060. W. Moberly.

July 30th.

1823. E. P. Chevalier.
2121. J. B. Robinson.