the many hogs which, on some of these islets, run half wild in the shady coverts, feeding luxuriously on crabs and other sea-waifs, habitually root holes on the beach with their snouts, whereto they subsequently resort to quench their thirst, as though they anticipated that refreshing result to their labour. Was this only blind instinct?

HYDRAULIC POWER.—In the lately-inaugurated docks at Swansea, that which deservedly attracted most attention was the wonderful hydraulic apparatus of Sir W. Armstrong, which was well worth the £20,000 it cost to the trustees of the docks. The extent of the pipes belonging to it is one and a half miles, having a pressure of 700lbs. to the square inch, and this vast power is available through the entire length of the pipes, and under the most perfect control. It opens gates, swings the bridges, works the sluices, lifts the hoists, and obediently executes all kinds of laborious duty. Yet this astonishing power can be wielded by the hand of a delicate woman. On the ceremonial opening of the docks, the gates were literally opened by Miss Talbot, the daughter of the Lord-Lieutenant. Standing on a raised platform, this lady grasped the handle of the capstern, which, in honour of the occasion, was of silver, and bent it from her with scarcely more effort than would have been needed to open the door of her own boudoir, when, obedient to the gentle impulse, the ponderous gates revolved upon their massive hinges, with a sullen clangor.

COLOUR PHOTOGRAPHED.—Photography, which has hitherto only been able to give neutral effects of light and shade, has finally succeeded in imparting to its productions all the brilliancy of natural colours. M. Becquerel has happily obtained a photograph of the prismatic spectrum in its proper beauty on a silver plate coated with *chlorine*. Into a bath formed of eight equivalents of water to one of hydrochloric acid, a silver plate was plunged connected with the *positive* pole of a voltaic battery, to the *negative* pole of which was attached a piece of platinum. The electric force, decomposing the acid, caused the deposition on the plate of a delicate violet-coloured film of chlorine, very sensitive to light, and receptive of colour. By subjecting the plate yet longer to the voltaic action, the thickness of the film was increased, and the colours rendered more brilliant, but the sensitiveness was proportionately diminished.

STRYCHNINE.—In cases of poisoning by this drug, the symptoms of which are rigidity and paralysis, with tetanic convulsions on being touched, the most available, if not surest, remedy is a strong solution of camphor dissolved in alcohol, administered in large doses, with sweet oil, followed by strong emetics. Two dessert-spoonfuls of mustard in warm water will answer for the last. In a recent case, related in the *Lancet*, twenty drops of tincture of iodine in water allayed the spasms, and allowed the emetics, previously administered without effect, to operate. The iodine, combining with the strychnine and forming a new compound, relieved the system from the spasmodic action on the spinal nerves.

ARSENICAL GREEN.—Few are aware of the extent to which poisonous materials enter into manufactures, and of the peril which is unconsciously incurred daily by purchasing articles wherein they form elements. Confectioners render their wares attractive by various poisonous matters; the use of arsenical green in paper-hangings is notorious from late discussions of the subject; and in the formation of artificial flowers it is known as Schweinfurth green. Sometimes natural grasses are dyed and steeped in a solution of double salt of arseniate and acetate of copper to form wreaths, originating, both in the poor artificers and those who indiscreetly wear them, painful eruptions and ulcerations, which may become chronic and incurable. Every article into which this poison enters should be scrupulously shunned, since it can penetrate the system alike through the skin, the respiratory, or the digestive organs. Emanations are thrown off by it, which, being inhaled, affect the eyes, throat, and lungs, produce eruptions and giddiness, and, by the accumulative process, end by slaying suddenly, as in cases of ordinary poisoning. Its mere contact with the skin ulcerates it. The French Government has interdicted the use of all toxic substances to confectioners, and it would be wise were the example followed. To obviate the dangers of arsenical green, it has been proposed to incorporate it with collodion, which, by fixing the poison, prevents emanation. *Collodion* is gun-cotton dissolved in ether, containing one-eighth alcohol, and *gun-cotton* is ordinary cotton wool steeped in a solution of three parts sulphuric acid, and two of powdered nitrate of potass. M. Guignet, of the Polytechnic, has lately discovered a chrome green, that may advantageously replace arsenical green, prepared from hydrated oxide of chromium. It is free from any objectionable properties, is very brilliant, and may be produced for 4s. per lb.

AIR A MOTIVE POWER.—Application has been made to the authorities of the city of Paris for permission to establish a system of pipes, similar to those used in the distribution of gas or water, for the introduction and circulation of compressed air, to be used as a motive power where required, throughout the city. It is stated that the air, thus furnished from pneumatic reservoirs without the walls, will be under entire control of the operative, being turned on or shut off at will, like gas, a meter indicating the amount used by each person; that it will not only move machinery, but may be economically applied to ventilation, warming dwellings, and elevating water, while a simple turncock may replace the cumbrous bellows ordinarily used by smiths. It is asserted that the use of air in this manner is entirely devoid of danger, since even should a pipe burst, the escaping air can be injurious only to the company by its loss.

TELEGRAPHS.—The influence of a recent aurora at Southampton on the telegraph wires was such, that communications with London were interrupted for three hours.

TALL CHIMNEY.—A remarkable one has recently been erected at the Crawford-street chemical works, Glasgow. It has an entire diameter of 34 feet at the base, that of the shaft within being 20 feet, and soars to the extraordinary height of 468 feet. A million and a half of bricks were employed in its construction, at a cost of £10,000.

Puzzles for the Ingenious.

SOLUTIONS OF THE QUESTIONS IN PAGE 351, VOL. IV.

QUESTION I.—Four graziers, A, B, C, and D, rent a grass field, for twelve months, for £40. A pays £17, and puts in 40 oxen; B pays £12, and puts in 25 oxen; C pays £7, and puts in 15 oxen; D pays the remainder, and puts in 10 oxen. How long ought each lot to graze?

ANSWER.

A's = £17 × 40 = £680
B's = 12 × 25 = 300
C's = 7 × 15 = 105
D's the rest = 4 × 10 = 40

Jointly = £1125

Months.

Then, as £1125 : £680 :: 12 : $7\frac{285}{1125}$ = A's.
" : 300 :: " : $3\frac{225}{1125}$ = B's.
" : 105 :: " : $1\frac{135}{1125}$ = C's.
" : 40 :: " : $\frac{450}{1125}$'s of a month.

Proof = months 12 = D's.

Months. Months. Months. Months.

Ans., A's = $7\frac{285}{1125}$, B's = $3\frac{225}{1125}$, C's = $1\frac{135}{1125}$, D's = $\frac{450}{1125}$.
Or Ans., A's = $7\frac{19}{75}$, B's = $3\frac{1}{5}$, C's = $1\frac{3}{25}$, D's = $\frac{2}{5}$'s of Mo.

Answers to the same effect, though by different modes of working, have been received from R. Mark; J. Fagan; A. F. Thomson; W. Freir; S. Butts, jun.; J. Mottram; G. W. S.; Anchora; H. Hill; J. Archbold; C. F. Lumb; W. K. Clifford; Kappa; E. M——n; H. Rauthmell; J. R. Watson; J. S. (Campbeltown); R. G. M.; R. C.; E. H. V.; J. B.; H. Herbert; F. McNicol.

QUESTION II.—Divide 100 into two such parts that the fifth power of the one multiplied by the square of the other shall be a maximum.

Let x denote the one part. Then $100-x=a-x$ will be the other.

Now $x^5 (a-x)^2$, that is $x^7-2ax^6+a^2x^5$, is to be a maximum by the question.

To effect this, let each term be multiplied by the exponent of x in that term, and let the result be put equal to 0, which is Hudde's method.

Then $7x^7-12ax^6+5a^2x^5=0$, and dividing by x^5,
$7x^2-11ax+5a^2=0$.

The same result may be obtained by fluxions. Since a quantity ceases to increase at the maximum, the fluxion must of course be nothing at the maximum. We therefore take the fluxion of the quantity that is to be a maximum, and put it equal to 0. Thus we have—

$7x^6\dot{x}-12ax^5\dot{x}+5a^2x^4\dot{x}=0$, and dividing by $x^4\dot{x}$,
$7x^2-12ax+5a^2=0$, the same as before.

By resolving this quadratic, we get—

$$x=\frac{6a\pm\sqrt{(36a^2-35a^2)}}{7}=\frac{6a\pm a}{7}=\frac{600\pm100}{7}=100, \text{ or } 71\tfrac{3}{7}.$$

The former of these values is of course inadmissible, as it would give nothing for the other part. The two parts, therefore, are $71\frac{3}{7}$ and $28\frac{4}{7}$. KAPPA.

Similar answers have been sent in by J. McB.; W. K. Clifford; G. W. S.; Oδτις; H. Herbert; W. Easterby; H. Hill; Gulielmus; J. S. (Campbeltown); Thomas; R. Dickins; W. Marchant.

FOR SOLUTION.

To a certain wall I applied a ladder in such a way that the foot of it was eight feet from the bottom of the wall, while the top of it exactly reached the top of the wall; and, on drawing it back four feet at the foot, I observed that it fell two feet at the top. What was the height of the wall? Note, the ground was quite level.

*** We again repeat, that we decline the insertion of any questions which are unaccompanied by clear and correct solutions. We request also an assurance that the questions sent are *original*.

ON THE NEW YEAR.

TO A YOUNG LADY FROM HER AFFIANCED LOVER.

OLD TIME, as he rapidly steals on his way,
Leaves traces behind him we everywhere see;
But though the whole world were to change every day,
Thou would'st still be the same in thy fond heart to me.

Thy many strong proofs of unwearied affection—
Affection long nurtured in sorrow and pain—
No time shall efface from my fond recollection,
While recollection forms part of my brain.

True love in this world is a thing quite alone—
A link between mortals which time cannot sever;
And like its own heaven, where time is not known,
'Tis the same yesterday, to-day, and for ever.

The old year and its sorrows will vex us no more,
But yet there are times when tears moisten my pillow:
'Tis with us as it was with the Hebrews of yore—
The harp of our Hope is still hung on the willow.

But while I may see thee, and while the soft tone
Of thy cherishing voice may at times reach my ear
I will not repine that I wander alone,
Nor upbraid with my sorrows the newly-born year

He, perhaps, has in store for us many a day
When his sun, like a bridesmaid, shall rouse thee a bride,
And strew, with spring flowers, thy redolent way
With thy heart's early chosen for companion and guide.

He may mean in his course to make ample amends
For all his precursor inflicted of pain,
And may leave us to wish, when his bright journey ends,
That his many sweet days could come over again.

NEW YEAR'S DAY IN THE VOSGES.

ALL over the world New Year's Day is a season of rejoicing; but in these prosaic times of ours there is not the same complete yielding up of families and nations to festivity as prevailed in a former age. Many good old customs have been left far behind in these locomotive, progressive, go-ahead days of ours. We give parties, and trust to creature comforts for the remainder of the entertainment. We have a little quiet dancing—not in the least like old-fashioned dancing; a little singing, perhaps with a conversational accompaniment by everybody in the place; a little charade acting. This is not the way our ancestors welcomed the new year; they were hearty and earnest, and meant to be merry, and not particularly "genteel." "Why are you not out a dancing with your mates?" said Jonas Hanway to a little chimney-sweeper, one fine May morning. The child of soot looked upon him with pity, and answered, "'Cause master says it ain't genteel!" The eyes of othe people ruin us. What will Mrs. Grundy say? Over the way and next door are looking on; we must preserve the conventional forms of our order; we must not do as we like—we must do as our friends like.

Therefore is it many good old customs have been given over, and you only find them observed in out of the way places, where they have lingered for a while, but from which they will be finally swept away. Down in the country, at some old farmhouse, you have made merry at Christmas and New Year in a manner totally incompatible with the received notions of Gulliver Square and Lilliput Crescent. You know you have! Just because there were no prying eyes to watch you, and nobody to cry "Fie!"

It is precisely the same with our friends on the other side of the Channel. It is only in country parts that good old French customs are preserved. In the Vosges, for instance, the old and new year are still celebrated very much in the same way as they were centuries ago, when the Maid of Orleans fought with the sword of Deborah, and that "dove-feathered raven," Louis XI., plotted wickedness with his iniquitous barber.

Towards the close of the old year in the Vosges, specially in the festival of Saint Sylvester, troops of children parade the villages, singing an old song with the well-known burthen, "*Au gui l'an neuf.*" The expressions in this song are varied, but the theme is invariably the same, indicating a common origin modified by the provincial dialect.

On New Year's Day all the children are accustomed to offer their congratulations to their parents, usually presented in the traditional mode, namely, wishing them long life and happiness in this world and the next. The youngest child is generally the mouthpiece of the rest. After the oration all the children embrace their parents and each other, and little cakes, called *veeks*, are distributed amongst them.

The grown-up folks, dressed in their Sunday clothes, and brave in ribbons, then march off to pay their respects to one another, or to take their children to visit their godfathers and godmothers, to whom they address similar compliments and good wishes to those which they have already offered to their natural parents. Each child receives a cake, called a *courrien*, and generally a piece of money, varying in

CELEBRATION OF NEW YEAR'S DAY IN THE VOSGES MOUNTAINS.

amount according to the wealth or generosity of the giver.

The out-door fête, which is the most interesting feature of the occasion, is usually celebrated near a fountain.

Part of the night preceding the dawn of the new year is devoted by the girls to preparing a sort of Maypole, or, rather, a gigantic Christmas tree. They produce for this purpose a young pine, or a young holly tree full of scarlet berries; this they decorate with ribbons, coloured eggs, little figures representing an amorous shepherd with a bouquet in his hand; a bad husband thrashing his wife; a trooper of ferocious aspect, or a village coquette in gala costume. Thus decorated, the tree is planted near the fountain, and the girls emulate each other in their efforts to make it as beautiful as possible.

During the day the villagers come to present their homage to the tree, which is to occupy the same place for the whole year, and is regarded as a symbol of Heaven's protecting care over all those who shall gossip under its branches, or fetch water from the fountain.

When the evening sets in, the snow is carefully swept away from the roots of the tree, and the girls, forming a circle, sing and dance round it, the young fellows looking on, but not allowed, without special permission, to join in the amusement.

As the children's songs—to which allusion has already been made—differ in different parts, and at different times, but still bear marks of a common origin, so the girls' songs of the new year's tree are not always exactly the same, but are invariably of the same description. A verse or two of one of these Christmas songs most popular in the Vosges may be thus freely translated:—

We have planted the new year's tree,
Its boughs are gaily dressed;
But here no flower will blossom—
No bird will build its nest.
We love the tree as a sister,
Our love is not in vain;
The tree we'll guard all through the year
Till Christmas comes again.

La! la! the new year's tree we raise,
And dance a measure in its praise.

We have planted the new year's tree,
Exerting all our powers,
That it may bless us through the year,
And prosper us and ours.
For this tree is our sister
So tender and so dear;
As we go dancing round her now
We christen the new year.

La! la! the new year's tree we raise,
And dance a measure in its praise.