able regarding the durability of the particular specimen of paving under notice; but the experience gained from the Rue Bergère, in Paris, which was laid in 1865 with Val de Traverse asphalt, is quite sufficient on the point in question. After having been in use for fifteen years, a portion of it was lifted in 1869, when it was observed that its thickness had only been reduced from two inches to one and three eighth inches: but while it had diminished in thickness only five-eighths of an inch in fifteen years, it had undergone considerable compression, inasmuch as the actual loss in weight was not more than five per cent. The special feature of the new paving in Glasgow is the almost absolute immunity from slipping which horses enjoy when passing over it.

Correspondence.

Invention of a New Numerical System.

To the Editor of the Scientific American:

In our common decimal system, distinct characters are given to the numbers from one to ten; and it is very well known that, instead of ten, any other number—for instance, eight, or twelve, or sixteen, or even two—may be selected for a base. Such systems have actually been calculated, but they have not come into use: the advantages not being sufficient to counterbalance the inconvenience of changing one system into another.

The subject may be treated, however, in quite a different manner. There is no necessity for taking any base at all, and the numbers may be made to progress in their own natural succession; or, to expressit in other words, every number, even one, may be made to serve as a base for a certain time. This can be accomplished as follows:

Instead of dividing off the original units in sections of ten, as in our common numerical system, we divide them in the natural succession of the numbers themselves, first one, then two, then three, etc., and for each division we make a mark in the second column. If, in the first column, a rest should remain, such rest can never be greater than the number of marks in the second column, because if the rest were one greater, a new mark would be made in the second column.

There is no necessity at present for going through the whole process, which would require a great deal of writing and many diagrams. It has taken me nearly twenty years to construct the first twenty numbers. Suffice it to say that the final result is very simple, and can be readily understood by everybody without studying the details.

The whole theory is based upon the fact that the rest in any column can never be greater than the number of marks in the next column. If the marks in the second, third, and all following columns, and all the rests, are divided in the same way, that is, in the natural succession of the numbers one, two, three, and so forth, the numbers will appear in a very simple form, each consisting of a base and a rest; this rest, however, is sometimes naught.

Of course there must be certain characters for the numbers, and the characters of our common numerical system are neither suitable nor sufficient; there must be twenty new characters instead of ten. Hence we have either to invent new characters or use the common letters. The first would require new types for printing, which is too expensive, hence we use letters.

Let the first twenty letters, excluding *j*, represent the first twenty numbers, so that *a* stands for 1, *b* stands for 2, etc., until *u* stands for 20; and let one of the last letters, for instance, *x*, stand for 0. Let us write these numbers in the following triangular shape:

					*u*20
				*o*14	*t*19
			*i*9	*n*13	*s*18
		*e*5	*h*8	*m*12	*r*17
	*b*2	*d*4	*g*7	*l*11	*q*16
*x*0	*a*1	*c*3	*f*6	*k*10	*p*15

These letters and numbers mean:

x stands for 0, *a* stands for 1, *b* stands for 2, etc.

It will be seen that the vowels *e*, *i*, *o*, *u* stand at the head of their columns; if the letter *j* were used, this order would be disturbed.

These letters and numbers are to be used as follows:

Naught	with	the	rest	naught	equals	naught,	equals *x*
One	"	"	naught	"	one	"	*a*
One	"	"	one	"	two	"	*b*
Two	"	"	naught	"	three	"	*c*
Two	"	"	one	"	four	"	*d*
Two	"	"	two	"	five	"	*e*
Three	"	"	naught	"	six	"	*f*
Three	"	"	one	"	seven	"	*g*
Three	"	"	two	"	eight	"	*h*
Three	"	"	three	"	nine	"	*i*
Four	"	"	naught	"	ten	"	*k*
Four	"	"	one	"	eleven	"	*l*
Four	"	"	two	"	twelve	"	*m*
Four	"	"	three	"	thirteen	"	*n*
Four	"	"	four	"	fourteen	"	*o*
Five	"	"	naught	"	fifteen	"	*p*
Five	"	"	one	"	sixteen	"	*q*
Five	"	"	two	"	seventeen	"	*r*
Five	"	"	three	"	eighteen	"	*s*
Five	"	"	four	"	nineteen	"	*t*
Five	"	"	five	"	twenty	"	*u*

This shows that every number may be supposed to consist of a base and a rest. After 20, the progress of the numbers is very easily seen, and may be stated as follows:

Six	with	the	rest	naught	equals	twenty-one, equals *fx*
Six	"	"	one	"	twenty-two	" *fa*
Six	"	"	two	"	twenty-three	" *fb*
Six	"	"	three	"	twenty four	" *fc*
Six	"	"	four	"	twenty-five	" *fd*
Six	"	"	five	"	twenty-six	" *fe*
Six	"	"	six	"	twenty-seven	" *ff*
Seven	"	"	naught	"	twenty-eight	" *gx*
Seven	"	"	one	"	twenty-nine	" *ga*
Seven	"	"	two	"	thirty	" *gb*
Seven	"	"	three	"	thirty-one	" *gc*
Seven	"	"	four	"	thirty-two	" *gd*
Seven	"	"	five	"	thirty-three	" *ge*
Seven	"	"	six	"	thirty-four	" *gf*
Seven	"	"	seven	"	thirty-five	" *gg*

The general rule for writing these numbers is: The second part is to be increased until it equals the first part, and then the first part is to be increased by one.

This table shows the construction of the numbers from 0 to 359026206.

x=0	*q*=16	*gd*=32
a=1	*r*=17	*ge*=33
b=2	*s*=18	*gf*=34
c=3	*t*=19	*gg*=35
d=4	*u*=20	
e=5	*fx*=21	*uu*=230
f=6	*fa*=22	*f x x*=231
g=7	*fb*=23	
h=8	*fc*=24	
i=9	*fd*=25	
k=10	*fe*=26	*u u u u*=26795
l=11	*ff*=27	*f x x x*=26796
m=12	*gx*=28	
n=13	*ga*=29	
o=14	*gb*=30	
p=15	*gc*=31	*u u u u u u u u*=359026205
		f x x x x =359026206

FERDINAND EISSFELDT.

Room 30, 33 School street, Boston, Mass.

An Invention Wanted---Five Thousand Dollars Reward Offered.

To the Editor of the Scientific American:

Believing that the horse has served his time before the street car, and that American ingenuity should allow him to retire before our Centennial anniversary, by inventing some improved motor for street passenger railways, we offer five thousand dollars reward to any person or persons who will invent, perfect, and present to this company any satisfactory device that will propel our cars and can be used on the streets of Philadelphia, provided it is acceptable to this company and its control placed exclusively with us.

R. W. FLOWER, JR., President.

West End Passenger Railway Company of Philadelphia, No. 206 South Fourth Street, Philadelphia. May 7th, 1875.

Useful Recipes for the Shop, the Household, and the Farm.

In using Paris green to exterminate the potato bugs, the poison should be mixed with the cheapest grade of flour, one pound of green to ten of flour. A good way of applying it to the plants is to take an old 2 quart tin fruit can, melt off the top, and put in a wooden head in which insert a broom handle. Bore a hole in the head, also, to pour the powder in, and then punch the bottom full of holes about the size of No. 6 shot. Walk alongside the rows, when the vines are wet with dew or rain, and make one shoot at each hill.

In some parts of the country, there have been large numbers of the orchard or tent caterpillars which have left their rings of eggs on the young twigs. If these are now cut off with a clipping pole, it will prevent in every instance a large nest of caterpillars, and be much more easily done than after the latter have grown.

Equal proportions of turpentine, linseed oil, and vinegar, thoroughly applied and then rubbed with flannel, is an excellent furniture polish.

Tin can be removed from copper vessels very thoroughly by immersing the objects in a solution of blue vitriol.

The German washerwomen use a mixture of 2 ozs. turpentine and 1 oz. spirits of ammonia well mixed together. This is put into a bucket of warm water, in which ½ lb. soap has been dissolved. The clothes are immersed for twenty-four hours and then washed. The cleansing is said to be greatly quickened, and two or three rinsings in cold water remove the turpentine smell.

Five parts of sifted whiting mixed with a solution of one part glue, together with a little Venice turpentine to obviate the brittleness, makes a good plastic material which may be kneaded into figures or any desired shape. It should be kept warm while being worked. It becomes as hard as stone when dry.

Artificial malachite which is susceptible to a fine polish is made by precipitating a solution of sulphate of copper in the cold by carbonate of soda or of potash. The precipitate, which is voluminous, should be allowed first to cohere, and is then dried and washed.

Water containing about seven grains of salt in each pint, is, when used continuously, a poison to the weaker forms of vegetation.

The alloy popularly known as oroide, from which a large number of cheap watches, chains, and trinkets are now manufactured, is made of pure copper 100 parts, tin 17 parts, magnesia 16 parts, sal ammoniac ½ part, quicklime ⅛ part, tartar of commerce 9 parts. The copper is first melted, then the magnesia, sal ammoniac, lime, and tartar in powder are added little by little and briskly stirred for half an hour. The tin is lastly mixed in in grains until all is fused. The crucible is covered, and the fusion maintained for 35 minutes, when the dross is skimmed off and the alloy is ready for use.

A simple way of preparing paper for bank checks, bills, etc., so that no writing can be erased without leaving plainly visible marks, is to pass the sheets through a solution of gallic acid. One milligram (0·01543 of a grain) is dissolved in as much pure distilled water as will fill an ordinary soup plate to a moderate depth.

Sandarac varnish is the best material for mending plaster models. Saturate the broken surfaces thoroughly, press them well together, and allow them to dry.

Silver ware may be kept bright and clean by coating the articles (warmed) with a solution of collodion diluted with alcohol.

Dampness will cause honey to become thin and watery.

The Suet Butter Manufacture.

In spite of the prejudice which exists against suet butter, it is a fact that the manufacture has of late made great progress; and the quantity of the material now consumed is certainly now larger than ever before. We illustrated the mode of making the butter many months ago. The process then described is the same as now practised in this city and other places, under the original patent granted to M. Hippolyte Mége.

There is a large factory in Hamilton, Canada, from which some 2,000 lbs. per week of imitation butter are shipped to all parts of the world. Another and still larger establishment in Boston, Mass., turns out a very great product. In many cases, it is said, this butter finds its way directly to the butter producing districts of New York and New Jersey, and then is sent to market as genuine spring butter. It is certain that immense quantities of the oleomargarin are sold by dealers as true butter, and that the profits of the trade are very large. We see it noted in a daily contemporary that the suet compound is in use in some of the principal hotels and restaurantsin this city,and that the frequenters of these places have as yet not discovered the fact. We do not pretend to the skill of the professional butter taster; but we have no difficulty in instantly recognizing the artificial compound. We may add that,not long ago,we discovered it on the table of one of our New York hotels; and aftersatisfying ourselves as to its identity, we taxed the proprietor with its use. He strenuously denied the charge; but at a subsequent meal, we found the "ox butter" (as the Harvard students have named it) replaced by "cow butter."

We do not mean to say that the oleomargarin is unsavory or unwholesome. On the contrary, it is made with the utmost nicety from the cleanest of materials. Neither is it unpleasant in any marked degree to the palate, nor to the stomach. It certainly is infinitely better than the abomination sold by grocers under the generic name of "cooking butter." Still most persons have a prejudice against suet butter, and that feeling, so far from being weakened, has been strengthened by the knowledge that the reprehensible practice of selling the imitation as the genuine is so widely practised. If the material were advertised and sold uniformly for what it is and on its merits, we have no doubt but that the prejudice against it would in a great measure subside. For shipping to hot climates, it is, no doubt, far better than the butter usually sent to southern ports.

Parliamentary Signal Light.

The gas signal light on the clock tower of the Houses of Parliament is now shown from its new position, 30 feet higher than formerly. The new lantern is constructed to run in and out of a loophole in the roof of the tower—similarly to a ship's gun—so that during the daytime nothing is seen of it, and it is now no disfigurement to the appearance of the tower. The illuminating power is a Wigham's patent gas light, as used for lighthouses, and at present is shown naked, no lenses being used. The light is only visible while the House of Commons is actually sitting. Immediately on an adjournment, the light is extinguished. This light is fully described on page 403, volume XXVIII, and page 40, volume XXIX.

A New Indication of Death.

Is the patient really dead or not? is at times a very anxious question. A medical practitioner of Cremona proposes a simple method by which the question may be answered with certainty. It is to inject a drop of ammonia beneath the skin, when, if death be present, no effect, or next to none, is produced; but if there be life, then a red spot appears at the place of the injection. A test so easily applied as this should removed all apprehension of being buried alive.

ELECTRIC science occupies a place of no mean importance in the new opera house in Paris. A special room is set apart as a battery room, in which 360 Bunsen's cells, arranged in sets of 60 on rough plate glass tables, are manipulated to pass a current to any part of the stage, so as to direct the electric light upon any point of the scenery. The sunlight and startling effects produced by French scenists are really beautiful. The rainbow in the opera of *Mosè in Egitto* is wonderful.

AN agreement without consideration is void.