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## Rail-Road News.

Pacific and Mississippi Railroad.

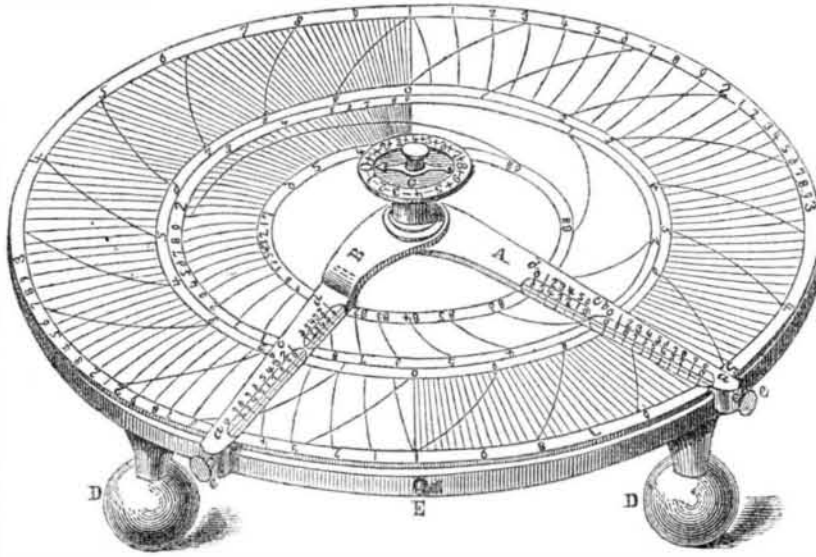
Professor Forrest Shepherd, in a letter to the  
New Haven Palladium says:—

"In relation to the projected railroad from  
the Mississippi River to the Pacific, that the  
road can be constructed from the Pacific to  
the Mississippi, without crossing any moun-  
tains, or encountering so much snow as be-  
tween Boston and Albany. He says this  
route is from the head or southern portion of  
Pularo Valley, through Walker's Pass, thence  
to the Mejearee River, thence north-eastward  
to high grounds on the tributaries of the Rio  
Colorado, thence crossing the said river above  
the great Carion, thence east to Pilot Mountain  
near Santa Fe, passing Pilot Mountain on the  
north side, thence to Santa Fe and the Missis-  
sippi at Apple Creek below St. Louis, where  
there is a good landing and open navigation  
to New Orleans through the winter, and of  
course a road on the bank of the Mississippi to  
St. Louis. The route will be 600 or 800 miles  
nearer than any other, has wood and water  
nearly the whole distance, and abundance of  
stone and coal at Santa Fe. The above route  
will accommodate both North and South,  
New Mexico and California, and ocean steam-  
ers will soon render a trip from San Francis-  
co and Astoria as light a matter as at present  
from Buffalo to Chicago or Mackinaw. The  
route further north is very objectionable on  
account of the snow ever on the table lands on  
the head waters of Feather River. I have  
travelled over snow apparently undrifted, vary-  
ing from 12 to 20 feet in depth, in the month of  
June. Fine specimens of native silver, report-  
ed, too, to be abundant, have been brought  
to me from the line of the Southern route."

He adds:—

"I have now explored California for nearly  
two years, and I can truly say it is a land of  
wonders. There are fresh flowers every month  
in the year, and Winter now wears the bloom  
of Spring. I have found water falls three  
and four times as high as Niagara, natural  
bridges of white marble, far surpassing in beau-  
ty that of Rockbridge in Virginia. Some  
thousands of gold bearing veins, inexhaustible  
quantities of iron and chrome ores, lead,  
bismuth and quicksilver, most beautiful por-  
celain clay, and in short almost everything  
that can bless an industrious and enterprising  
people. In one valley I found more than forty  
springs of a temperature over 100° Fahren-  
heit. In another valley sixteen geysers, like  
the famous one in Iceland. In this famous  
abode of Vulcan the rocks are so hot that  
you can stand upon them but a short time,  
even with thick boots on. The silicious rocks  
are bleached to snowy whiteness, and breccia-  
ted and conglomerate rocks are now actually  
forming. The roar of geysers at times may be  
heard a mile or more, and the moment is one  
of intense interest as you approach them.

## NYSTROM'S NEW CALCULATING MACHINE.



This machine is the invention of Mr. J. W.  
Nystrom, of Philadelphia, and was patented  
in March last. The inventor is a learned and  
very ingenious engineer, and this machine is  
the most important one ever brought before  
the public. We cannot even give all the ex-  
amples of its powers we would like, for want  
of room, rather because of the extent of its  
operations, but after a description we will  
present a few.

The Calculating Machine represented in  
the accompanying engraving, consists of a  
round disc of metal or other suitable material,  
mounted upon three feet, D D; it has two  
graduated arms, A and B, on which are mark-  
ed *a b c d*, representing the four different figure  
circles on the disc. In the centre of the disc  
is a screw, C, to clamp the two arms, A and  
B, together; when clamped they can be mo-  
ved freely around the disc. The circle *a*  
(marked on the arms) contains the numbers  
for Multiplication and Division; the circle *b*  
contains the numbers for Addition and Sub-  
traction, and also the Logarithms for the num-  
bers in circle *a*. The circles *c* and *d* are for  
Trigonometrical calculations, of which the  
numbers in circle *c* are an angle—the numbers  
in circle *a* showing the length of its sines; the  
numbers in circle *d* are the complement an-  
gles for circle *c*, and circle *a* its cosines.

The large figures in the circle *a* represent  
the first figure of a question, the small figures  
the second; the third figure will be found on  
the arms, and the fourth between the figures  
on the arms.

In the accompanying engraving, the arm, B,  
is set on 1449, (circle *a*), its logarithm=  
3.16106 (circle *b*). The arm shows an angle  
=8° 20' (circle *c*), which sines=0.1449 (cir-  
cle *a*). The complement angle=81° 40' (cir-  
cle *d*), which cosines=0.1449 (circle *a*).

The calculation with this instrument is bas-  
ed upon the principle of logarithms, though  
the logarithm in general cases need not be ob-  
served, but when the number of figures in the  
result is uncertain a correct account must be  
kept of the index of the factors; for that pur-  
pose there is a small hand on the top of the  
screw, C, which is to be moved by hand for  
each operation with the arms. Also any pow-  
er or roots of numbers can be easily extracted.  
The most difficult or simple calculation may  
be computed, from the simple addition and  
subtraction of numbers to the most complica-  
ted business accounts, and the higher branches  
of mathematical trigonometrical equations,  
are alike easily calculated.

At the end of each arm is a screw, *e*, to fas-  
ten the arms in any particular point of the  
disc.

MULTIPLICATION.—Rule 1.—16×12=192.

Set the arm, A, on the factor 16 (circle *a*) and  
the arm, B, on 1; fasten the two arms with  
the screw, C; move them until the arm B  
comes to the next factor, 12, the arm, A, shows  
the product=192. If more than two factors  
are to be multiplied together, consider the pro-  
duct of two factors as a new factor, and con-  
tinue the multiplication by the next factor, as  
aforesaid.

DIVISION.—Rule 2. 365:15=24.33. Set  
the arm A on the dividend, 365, and the arm  
B on the divisor, 15; fasten the arms with  
the screw, C; move them until the arm B  
comes to 1; the arm A shows the quotient=  
24.33. If the dividend contains more than  
one factor, multiply them as in rule 1, the  
product is the dividend. If, also, the divisor  
contains more than one factor, consider the  
quotient of the dividend and the first factor in  
the divisor as a new dividend, and continue  
the division by the next factors, as said in  
rule 2.

PROPORTION.—Rule 3.  $a:b=c:d$ . Set  
the arm, A, on the first term, *a*, and the arm  
B on the second term, *b*, fasten the arms with  
the screw, C; move them until the arm A  
comes to the third *c*, the arm B shows the  
fourth term, *d*. If the third term, *c*, is un-  
known, set the arm, B, on the fourth  
term, *d*, and the arm, A, will show the  
third term, *c*. If the arms be moved to any  
position on the disc, the numbers within the  
same will still remain in the same proportion  
as  $a:b$ . This fact makes it convenient to ma-  
nage vulgar fractions.

EXTRACTING ROOTS.—Rule 4.  $n\sqrt{m}=x$ .—  
Divide the logarithm (circle *b*) for the number,  
*m*, by the index of the root, *n*: that is to say,  
the index for the logarithm is kept with the  
small hand on the screw, C, and the mantissa  
on circle *b*, and the number *m* on circle *a*—the  
quotient (circle *b*) is the logarithm for *x*, (cir-  
cle *a*). [The mantissa is the decimal part of  
a logarithm.]

TRIGONOMETRY.—Rule 5.  $\sin. C = \frac{c \sin. A}{a}$

Set the arm A on the number *c*, and the arm  
B on the number *a*; fasten the screw, C;  
move the arms until the arm B comes to the  
angle A (circle *c*); the arm A shows the angle  
C (circle *c*). These operations are done in a  
few seconds, without having recourse to ta-  
bles of the trigonometrical lines or logarithms;  
the answer gives not only the sine C, but also  
the angle C itself, expressed in degrees, mi-  
nutes, and seconds, and in the operation sine  
A need not be observed, merely use the angle  
A. Any of the trigonometrical lines will be  
found on the machine—for instance, the area

of a right angled triangle,  $Q = \frac{c^2 \cot. C}{2}$  only  
the value of *c* and *C* is given; the operation  
on the machine is done in a moment.

Example 1.—What is the "pitch" of a  
propeller 9 feet 3 inches in diameter, the angle  
of the blades in the circumference being 53°  
45' ? Pitch= $3.14 \times 9.25 \times \frac{\cos. 53^\circ 45'}{\sin. 53^\circ 45'} = 21$  ft.

6 in. Set the arm A on 3.14, the arm B on  
1 (circle *a*); fasten the arms with the screw,  
C; move them until the arm B comes to 9.25;  
fasten the arm A with the screw *e*; loosen the  
screw C, then move the arm B to 53° 45' (cir-  
cle *c*); fasten the arms with the screw, C,  
then loosen the screw *e*, and move the arms  
until the arm B comes to 53° 45' (circle *d*),—  
the arm A shows the pitch=21.49 (circle *a*).

Example 2.—What is the angle V of the  
blades in the circumference of a propeller with  
a pitch=2½D ?  $\cot. V = \frac{P}{\pi D} = \frac{2.5D}{\pi D} = \frac{2.5}{3.14}$   
Set the arm A on 2.5, the arm B on 3.14 and  
fasten the arms with the screw C; move them  
until the arm B shows the same angle on cir-  
cle *c* as the arm A shows on circle *d*, and it  
will be found that the angle V=51° 30'.

A Calculating Machine for general business  
use will be about 9 inches in diameter; those  
for astronomical and the more particular  
branches, where a greater number of figures  
are required, will be about 2 feet in diameter,  
and the engraving of course will vary. An-  
other, for approximating calculations, intend-  
ed to be placed in pocket-books, will be about  
3 inches in diameter, printed on paper, the  
arms also being made of paper.

It is intended to publish a book to accom-  
pany the machine, containing numerous ex-  
amples and directions that will enable any  
person to use the same. This instrument was  
exhibited at the Annual Exhibition at the  
Franklin Institute, in 1849-50.

The inventor, not having the time to spare  
which this instrument deserves to have devo-  
ted to it, offers it to any person who will un-  
dertake the manufacture of it, or will buy the  
patent right; especially to any person enga-  
ged in the new art of Electrotyping: such  
persons will find it of great utility, as they can  
electrotype the disc, and thus save the ex-  
pense of engraving it and by saving this it  
will enable the manufacturer to sell it at a great-  
ly reduced rate, and bring it within the reach  
of every business man. Direct letters to J.  
W. Nystrom, 31 Union street, Philadelphia.

To Analyse an Alloy of Silver and Gold.

Laminate the alloy, and treat it by nitric  
acid, till nitrous gas ceases to be disengaged;  
the residuum well washed, and heated red,  
gives the quantity of gold. Next pour hydro-  
chloric acid into the solution to throw down  
the silver, wash the precipitate, dry and weigh  
it; 100 parts of chloride of silver are equiva-  
lent to 75.5 of silver. If the proportion of sil-  
ver in the alloy be very small, the nitric acid will  
only effect its partial solution; in that case  
add as much silver to the alloy by fusion as will  
make it at least equal to three-fourths of the  
mass. Account must be taken of the quanti-  
ty of silver thus added at the end of the opera-  
tion.

To Analyse an Alloy of Silver and Copper.

Dissolve the alloy in nitric acid, and dilute  
the solution with water, throw down the hy-  
drochloric acid, and filter the liquor, washing  
the precipitate till ammonia ceases to produce  
a blue color; then mix the washings with the  
filtered liquor, reduce it by evaporation, and  
add an excess of hydrate of potassa or soda to  
separate the deutoxyde of copper, from which  
the quantity of copper in the alloy is ascertain-  
ed, as that of the silver is learnt from the chlo-  
ride.