

"We recapitulate the formulas relative to the system of screw threads.

1st. The number of threads per inch $N = \frac{1}{P} = \frac{1}{0.096d + 0.026}$

2d. The depth of the threads for best finished screws $= T = 0.8P^\circ$.

" " " " merchantable " $= T = 0.75P^\circ$.

3d. The inscribed diameter of nut or head whether square or six sided,
 $D_n = 15d + 0.125$.

4th. The height of the nut, $H = d$

5th. The height of the head, $H = 0.8d$

6th. The diameter of the hole in the nuts before tapping out $= d_h$

The following table gives the results of the first of these formulas.

The following table gives the results of our discussion :

Diameter of Bolt.	Number of Threads.	Diameter of Nut.	Height of Nut.	Diameter of holes in nuts, allowing for upsetting of threads.	Height of Heads.
$\frac{1}{4}$	20	$\frac{1}{2}$	$\frac{1}{4}$	0.190	0.2
$\frac{5}{16}$	18	$\frac{9}{16}$	$\frac{5}{16}$	0.255	0.25
$\frac{3}{8}$	16	$1\frac{1}{8}$	$\frac{3}{8}$	0.297	0.30
$\frac{7}{16}$	15	$\frac{3}{4}$	$\frac{7}{16}$	0.355	0.35
$\frac{1}{2}$	14	$\frac{7}{8}$	$\frac{1}{2}$	0.410	0.4
$\frac{9}{16}$	12	$\frac{5}{8}$	$\frac{9}{16}$	0.452	0.45
$\frac{5}{8}$	12	$1\frac{1}{8}$	$\frac{5}{8}$	0.518	0.5
$\frac{3}{4}$	10	$1\frac{1}{4}$	$\frac{3}{4}$	0.62	0.6
$\frac{7}{8}$	9	$1\frac{7}{8}$	$\frac{7}{8}$	0.729	0.7
1	8	$1\frac{5}{8}$	1	0.84	0.8
$1\frac{1}{8}$	7	$1\frac{3}{4}$	$1\frac{1}{8}$	0.935	0.9
$1\frac{1}{4}$	7	2	$1\frac{1}{4}$	1.060	1.0
$1\frac{3}{8}$	6	$2\frac{3}{8}$	$1\frac{3}{8}$	1.152	1.1
$1\frac{1}{2}$	6	$2\frac{1}{2}$	$1\frac{1}{2}$	1.277	1.2
$1\frac{5}{8}$	6	$2\frac{9}{8}$	$1\frac{5}{8}$	1.402	1.3
$1\frac{3}{4}$	5	$2\frac{3}{4}$	$1\frac{3}{4}$	1.48	1.4
$1\frac{7}{8}$	5	$2\frac{1}{2}$	$1\frac{7}{8}$	1.605	1.5
2	$4\frac{1}{2}$	$3\frac{1}{8}$	2	1.7	1.6

Lime Abroad and at Home.

From the London Builder, No. 1140.

My experience being somewhat at variance with the statements put forward under this and a like heading in the last two numbers of the *Builder*, it may, perhaps, be worth giving. The mode described of making mortar in Southern Italy has been practised in this country, time, immemorial. A pit is dug in the ground, may-be 30 ins. deep,

large enough to contain perhaps a one or two horse-load of lime. Water is put into the pit, the lime is shoveled in gradually, while at the same time it is stirred to and fro with a mortar fork, and so on till the whole is dissolved to the consistency of thick cream; the stones of course settle at the bottom, and when the lime subsides the water is run off. In a short time a firm bed of putty is ready to make mortar of, then, or at any time within six months, if the lime-pit be protected from rain and sun. Of course a hard film or protective coating forms itself on the surface; under this the lime remains fresh and mellow to almost an indefinite length of time. Of mortar made with lime so prepared, I can testify from twenty years experience to its hard-setting and durable qualities. It has never occurred to me to test exactly the qualities of this as compared with any other mortar prepared from fresh-slaked lime; but I may observe that the practice of making mortar from lime-putty, and in the rough-and-ready way above described, seems to be dictated by necessity rather than choice. It prevails chiefly in the country where, from the great distance it has sometimes to be carted, it would be impracticable, for ordinary building purposes, to have fresh-slaked lime on every occasion. W. M.

An Account of Apparatus and Processes for the Chemical and Photometrical Testing of Illuminating Gas. By Prof. W. B. ROGERS.

From the London Athenæum, Oct., 1864.

The instruments and methods described in this communication are those adopted in the gas inspection lately organized by Prof. Rogers, for the State of Massachusetts; comprising the measurement as well as testing of gas. Connected with the former of these objects, an account was given of the adjustments of the standing measure for gauging gasholders,—of a universal clamp for meter-connexions,—and of an appendage combining a delicate thermometer and pressure gauge for the inlet and outlet of the meter, and by which the rate of delivery is accurately adjusted. For chemical testing, the eudiometer, consisting of a graduating tube, with cylindrical enlargement, is permanently enclosed in a wider tube full of water, which maintains the temperature nearly uniform. The mouth of the graduated tube is furnished with a hollow ground stopper, for holding the several liquid absorbents used in the successive experiments. With this apparatus it is easy to determine the percentage of carbonic acid, of illuminating hydrocarbons, of oxygen, and of carbonic oxide; after which the hydrogen and light carburetted hydrogen are ascertained by explosion, by means of an instrument consisting mainly of two glass tubes, united below by a long loop of rubber-tube, being a modification of Frankland's apparatus. For determining the sulphur, an improved arrangement is used, in which the stream of water supplying the Liebig's condenser is made to convey a stream of air, mingled with ammonia, into the condensing tube some inches above the flame of the burning gas. To secure a larger and more constant unit of illumination than the candle commonly used, a lamp burning kerosine, with a flat wick, is employed, in