Report of Dust Survey at U. S. Gypsum Co. Plant

at New Brighton, Staten Island

PLAINTIFF'S EXHIBIT USG 184

Made by the Saranac Laboratory

June 1 - 5, 1936

A survey of the dust condition existing in the New Brighton plant of the U. S. Gypsum Co. was made on June 1 - 5, 1936 by the Saranac Laboratory and the results are given in this report. The products of the plant include land plaster (ground gypsum); calcined gypsum alone, as plaster of paris, or in mixtures such as cement plaster and sanded plaster; gypsum building blocks; and gypsum wall board. The plant can produce approximately 300 tons of stucco (calcined gypsum) per day, of which about two-thirds would be calcined in long rotating kilns and one-third in ovens or "kettles". The block plant has a daily capacity of 30 tons of blocks and the board plant can make 100,000 feet of composition wall board each day.

The New Brighton plant extends along the water-front for one third of a mile and receives its raw materials (gypsum rock, sand) by boat. There are two kinds of raw gypsum rock : dark and white. The dark rock is discharged from the boat into storage silos from which it is withdrawn as needed and fed to a conveyor belt in a tunnel underneath the silos. After being carried to a crusher, where it is reduced to small size, the rock is passed through screens, calcined in long rotary kilns, ground fine in tube mills and transported to the stucco bins for storage. From the bins the stucco [illegible] either [illegible] to [illegible] packer to be loaded into [illegible] for shipment.

The silos are at the south end of the plant; near the north end are large bins for the storage of white rock. Farther on are the buhrstone grinders for grinding the rock fine and the "kettles" in which it is calcined. The "kettles" and rotary kiln calciners do not produce exactly the same type of calcined gypsum, because in the "kettles" the flame is separated from the charge while in the calciners the products of combustion and the charge are intimately mixed.

The warehouse occupies the middle portion of the plant on the side adjacent to the water. Here are located the machines for mixing and packing plaster, the stucco bins and the laboratory. Much of the warehouse floor space is used for storing bags of plaster. On the street side is the section of the plant in which are made building blocks and wall board.

<u>Permissible Standards of Dustiness</u>

It is generally conceded that the extent to which a hazard from silicosis or other form of pneumoconiosis might exist is indicated by the concentration in the industrial atmosphere of free silica or asbestos particles of respirable size. However, experience with mixed dusts, for instance silica and iron oxide, shows that the response of the body to inhaled silica is modified by the presence of the iron oxide. Animal experiments with artificial mixtures of quartz and calcined gypsum resulted in a delayed but typical reaction to the quartz. Apparently the protective action of the gypsum was a mechanical one, a clumping of quartz particles into aggregates too large to be air-floated readily. Nevertheless, knowledge of the action of mixed dusts is so limited that it is generally customary to base estimates of hazard upon the amount of free silica in the air-floated dust and regard gypsum and other non-siliceous constituents as merely diluents. The evidence from the present and previous surveys in the gypsum industry strongly suggests that this assumption is not universally applicable.

A concentration of five million particles of free silica per cu. ft. of air has been tentatively suggested as a limit above which a silicosis hazard might exist. This value is for dust samples collected with the Greenburg-Smith impinger apparatus and counted by the standard light field technique of the U. S. Public Health Service. The light field method reveals particles which are larger than a minimum size estimated to lie between 0.7 μ and 1.5 μ. Since the impinger apparatus collects and retains the majority of particles much smaller than that limit, down to 0.2 μ or smaller, a dark field method by which these smaller particles are made visible is also employed. There is no generally-accepted standard for safe dust concentration determined by the dark field method and it is used merely as an adjunct to the light field technique and as a guide in interpreting the general dust condition.

Good housekeeping standards demand that the amount of even apparently harmless non-siliceous dusts be kept within reasonable limits. A value of 100 million particles per cu.ft. of air (light field count) is sometimes given as a maximum concentration for any dust to which men are continuously exposed.

<u>Dusts encountered in Plant</u>

Although there is some variation in the composition of air-borne dust in the plant, the principal constituent is generally raw or calcined gypsum. Raw gypsum makes up most of the dust at the rock crusher, the calciners and tube mills, and the buhrstone grinder; calcined gypsum dust predominates in the warehouse, the block plant and the board plant. Also suspended in the air of the warehouse are particles of sand, wood fiber, jute fiber, lime, organic materials employed as a retarder, and occasionally small amounts of substances such as asbestos and talc used in special plasters. Much of the dust set up when sand is unloaded from the boat is undoubtedly quartz, since that mineral is in excess in the sand. In the operation of chipping buhrstone a dust which is almost pure quartz is generated.

Quartz and sand (owing to its quartz content) can be classed as definitely hazardous. Asbestos also falls in the same category but so little is used that it can be neglected. Clinical and experimental evidence has led to the conclusion that the inhalation of gypsum dust is relatively harmless; in fact, there is some basis for the belief that it has a protective action by engulfing quartz particles into clumps which settle out of the breathing zone. The other kinds of dust mentioned are regarded as unlikely to cause any type of pneumoconiosis.

Dust Concentrations in Plant

Dust samples were collected with the Greenburg-Smith impinger apparatus used in previous dust surveys for the U. S. Gypsum Co. The dust particles were counted by the light field method of the Public Health Service and also with dark field illumination as recommended by some investigators. Counts for both methods are tabulated at the end of this report. Most of the samples were collected in 95 per cent alcohol; for a few 25 per cent alcohol was substituted so that only quartz and other insoluble particles would remain undissolved.

<u>Unloading raw material</u>

Both gypsum and sand are received by boat. Dust samples for the unloading of gypsum could not be taken because no shipment of rock arrived during the survey. However, any dust raised would be principally gypsum and should not be harmful. Sand is unloaded by means of a bucket elevator which lifts the sand from the boat and discharges it on a conveyor belt in a small room. The dust concentration inside the room was quite high, being 160 million particles per cu. ft. of air. Since this dust is derived from sand which contains a large amount of quartz (by chemical analysis 80 per cent), it is dangerous. Therefore the man working in this vicinity should wear a respirator when inside the room; on the outside he is exposed to little dust because it is dissipated by the wind.

<u>Transporting and calcining raw rock</u>

Underneath the raw rock storage silos is a tunnel in which is the conveyor belt that transports raw rock to the crusher. The dust concentration in the tunnel was 30 million particles per cu. ft. of air. After being crushed the rock is lifted to the top of #8 building and then passed down through screens. One man works around these screens and the average concentration to which he is exposed was found to be 34 million particles per cu. ft. of air. The crushed rock is then calcined. There was only a moderate amount of dust around the calciners, the counts being 14 million for the calciner feed man, 13 million for the calciner fireman and 19 million for the tube mill operator.

Next to the "kettles" the dust concentration was 35 million particles per cu. ft. of air. Much of this dust was land plaster (ground gypsum) which was being loaded into cars nearby. Near the buhrstone grinders, where the rock to be calcined in the "kettles" is ground, the concentration of dust was less than 7 million particles per cu. ft. of air.

Chipping buhrstones

Buhrstones are nearly pure quartz and the chipping of them creates a dust that is definitely hazardous. The dust count for that operation was more than 17 million particles, a value which is above the safe limit. An exhaust system of dust removal was installed after the dust samples had been taken and it is believed that the concentration has now been reduced to a safe value.

Block and board plant

At the machine making gypsum blocks the dust concentration was 26 million particles per cu. ft. of air. For the board plant the dust counts were 9 million on the platform where the upper paper rolls are unwound and terra alba accelerator added; 19 million on the floor below where the semi-fluid gypsum is poured on the paper sheet; and 7 million near the machine cutting rocklathe boards. Since the dust in these localities is principally gypsum, the foregoing concentrations cannot be regarded as hazardous.

Mixing and packing plaster

The mixing and packing of plaster produce concentrations of dust that are quite high, as shown below. (Cement plaster is nearly 99 per cent calcined gypsum and sanded plaster is about 28 per cent calcined gypsum and 71 per cent sand.)

Dust Concentration Produced by the Mixing and Packing of Plaster

Kind of Plaster	Light Field Dust Count	
	Mixing Plaster	Packing Plaster
Cement Plaster	431.9 million	448.1 million
Sanded Plaster	[illegible].1 million	598.1 million

It appears that an exhaust system of dust removal reduces the dust concentration [illegible] by nearly one-half. Thus, the above counts of 448 and 598 million were for a packer with exhaust ventilation; counts for samples taken at the Oakfield plant near a [illegible] packer without an exhaust system were 941 and 1028 million.

Much dust is put in suspension when packing jute bags with land plaster, the light field count for that operation being 821 million and the dark field count having the extremely high value of 5317 million. The packing machine is equipped with exhaust ventilation but it is probably rather ineffectual because an opening in the back, left uncovered to allow weights to be changed, interferes with effective suction. This condition should be remedied and the full value of the exhaust system realized.

When packing 5 pound paper bags with plaster of paris one is exposed to a concentration of 46 million particles per cu. ft. of air. This dust (calcined gypsum) as well as the land plaster (ground gypsum) packed in jute bags is not considered to be dangerous.

In a report of a recent survey made at the Oakfield plant on March 18 - 20, 1936 attention was directed to the dust condition associated with the mixing and packing of sanded plaster. It was observed that the hazard presented by those operations was less serious than the total dust concentration alone would indicate because the proportion of quartz in the air-borne dust [illegible] the original mixture. The same condition has been found to prevail at the New Brighton plant. This is revealed by comparing samples collected in 25 per cent alcohol and in 95 per cent alcohol. In the former gypsum dissolves leaving only quartz and other insoluble particles, but in 95 per cent alcohol the gypsum particles do not dissolve. Counts for these samples are as follows;

Relative Dust Counts for Samples Collected
in 95 per cent and in 25 per cent Alcohol

Operation	Light Field Dust Count	
	95 per cent Alcohol Sample	25 per cent Alcohol Sample
Mixing Sanded Plaster	[illegible] million	72.0 million
Packing Sanded Plaster	396.1 million	1.7 million

The count for mixing sanded plaster, 25 per cent alcohol sample, is higher than one would expect and may be due to the presence of many organic particles, such as sisal fibers, in the air near the mixer. Weight is given to this explanation by the chemical analyses below, which show a higher ignition loss for the mixer sample than for the packer sample.

In order to obtain accurate knowledge of the composition of air-borne dust generated when sanded plaster was being mixed and packed, a suction motor equipped with a dust collecting bag was operated as described below.

Mixing sanded plaster

Motor was placed on top of scales, at breathing level, and operated for 40 minutes. Wt. of dust collected = 1.157 gr.

Packing sanded plaster

Kotor was suspended at breathing level, 4 ft. from man at Bates packer, and operated for 20 min. Wt. of dust collected = 0.180 gr.

Chemical analyses of the dust collected and also of sanded plaster ready for shipment were then made. The results are tabulated below.

Chemical Analyses of Sanded Plaster and Sanded Plaster Dust

	Sanded Plaster	Air-borne Dust	
		near mixer	near packer
Acid soluble material	33.6%	78.7%	78.4%
Acid insoluble material	62.5	5.0	10.8
Ignition loss below 110°	1.9	4.5	0.9
Ignition loss above 110°	2.0	11.8	9.9
	100.0	100.0	100.0
Total insoluble SiO_2	56.8	3.5	6.4
Estimated free SiO_2 (quartz)	50	2	3

These analyses of air-borne dust show that only a small fraction of the quartz in the sanded plaster mixture diffuses an appreciable distance into the surrounding air, either at the mixer or at the packer. This condition may be due to the large size of quartz particles or to the tendency of gypsum to form aggregates with the quartz. In either case the quartz would not be air-floated readily but would settle out.

From the above data it is evident that the mixing and packing of sanded plaster are operations which are not nearly so hazardous as they would appear to be. But neither can they be said to be entirely without danger. Packing sanded plaster produced a dust concentration of 596 million particles per cu. ft. of air; and about 3 per cent of the dust was quartz. If all particles were the same size there would be nearly 18 million quartz particles in a cubic foot of air. This would be a dangerous concentration. Undoubtedly the particles of quartz are larger than those of gypsum and therefore the concentration [illegible] is [illegible]. The low count of approximately [illegible] million insoluble particles for the 75 per cent alcohol sample taken at the Bates packer confirms this conclusion. Furthermore, the clumping action of gypsum probably reduces to a very low figure the number of quartz particles actually inhaled. This explanation may account for the apparent lack of silicosis among men mixing and packing sanded plaster.

[illegible]

[illegible] burlap sacks work in a high concentration of [illegible] - [illegible] million particles per cu. ft. of air - which remains fairly constant. The dust is set free when the empty [illegible] are [illegible] the count for a [illegible] ft. [illegible] million. [illegible] exposed to that high concentration [illegible] because there is much less dust in suspension while the bag [illegible] is being filled. The dust is mostly gypsum with some jute fibers.

Miscellaneous

At intervals a man must go inside the stucco bins and scrape stucco into holes in the floor. Clouds of dust are raised by this operation, producing the exceedingly high concentration of [illegible] million particles per cu. ft. of air. Although the dust is all calcined gypsum and therefore relatively harmless, it would appear desirable to work out a [illegible] of feeding stucco which would not require a man to work inside the bin.

The count for a dust sample collected in a passageway on the third floor of the warehouse was about 14 million. This sample represents an average exposure of men trucking plaster.

Considerable dust is raised when motors are blown out with compressed air, the light field dust count for the [illegible] [illegible] [illegible] [illegible] [illegible] many particles smal-ler than about 1 μ are present. The man who blows out motors wears a respirator and the high dust count emphasizes the necessity of his continuing to do so, especially since the dust may contain many quartz particles.

The dust concentration in the machine shop was about 2 million particles per cu. ft. of air and in the laboratory it was about 6 million.

Summary and Conclusions

1. It is recommended that the concentration of free silica (quartz) dust to which men are exposed be kept less than 5 million particles per cu. ft. of air. It is urged that a serious effort be made to meet "good housekeeping" requirements so that no man will be exposed continuously to dust of any kind in concentrations greater than 100 million particles per cu. ft. of air. These values refer to light field counts.

2. The man helping unload sand from the boat should wear a respirator when he is inside the house over the conveyor belt.

3. Buhrstone chipping without an exhaust system appears to be hazardous. It is believed that the suction device recently installed may eliminate the hazard.

4. Mixing and packing plaster produce dust concentrations far above "good housekeeping" limits. When the plaster is a sanded plaster, large amounts of quartz are used but analysis of the air-floated dust shows that little quartz is suspended in the atmosphere. However, owing to the high dust concentration, even the

small [illegible] of quartz may be sufficient to [illegible]. [illegible] the [illegible] dust concentration, [illegible] should [illegible] efficient exhaust system. If this is impracticable, the men should wear respirators.

5. The Bates packer at which land plaster is packed should be [illegible] to allow the [illegible] of the bags to be changed without rendering the exhaust system ineffective.

6. The high concentration of dust encountered by [illegible] by men at the [illegible] should be reduced. [illegible] ventilation would help.

7. The man screening [illegible] is exposed to an extremely high dust concentration. It would seem possible to arrange a way of doing this work from outside the bin.

8. Blowing out motors [illegible] considerable dust, some of which may be quartz particles. A suction method of removing the dust would be preferable because then it would not be put in suspension in the air.

[illegible signature]

Sample No.	Operation Represented	Location	Date and Sampling Time	Collecting Fluid	Remarks	Particles per cu.ft. of air - in millions		
						Light Field		Dark Field (Plankton) (Condenser)
						Above 10µ	Below 10µ	
1	Unloading sand from boat	Sample taken inside house where chute fed by elevator from boat discharges sand on conveyor belt	June 1, 1936 F 3.38 p.m. S 3.30 8 min.	95% Alcohol	Man is inside house about one-third of time; when outside he gets little exposure because dust is blown away. Man on boat not exposed to much dust. Good ventilation inside house; door 6 feet away open.	0.91	169.7	[illegible]
2	Working in tunnel under silos	Sample collected at breathing level 30' inside tunnel and next to conveyor belt	June 4, 1936 F 10.08 p.m. S 10.00 8 min.	"	Rock was being discharged from chute 30' farther on in tunnel. Moderate draft of air.	0.30	29.0	[illegible]
3	Working over rock screens at top of 10 building	Sample taken at breathing level in middle of floor to represent average location; near place where man shovels crushed rock into chute	June 2, 1936 F 11.36 p.m. S 11.30 6 min.	"	Man is on this floor most of time; on floor below near bins some of the time. Good ventilation.	0.86	34.9	71.6
4	Calciner feed man	Sample taken at bin at end of calciners; this represents an average location for man	June 3, 1936 F 11.10 p.m. S 11.00 10 min.	"	Good ventilation	0.20	14.2	[illegible]
5	Calciner fireman	Flask held at breathing level on platform in front of calciner gages.	June 2, 1936 F 10.26 p.m. S 10.20 6 min.	"	Calciner firemen here nearly all of the time. Good ventilation.	0.03	13.3	34.7

Sample No.	Operation Represented	Location	Date and Sampling Time	Collecting Fluid	Remarks	Particles per cu.ft. of air (in millions)		
						Light Field		Dark field
						above 10µ	below 10µ	(plankton counter)
6	Tube mill operator	Sample collected at breathing level, 4 min. on tube mill floor and 4 min. on conveyor floor, over area covered by tube mill operator.	June [illegible], 1936 F 10.35 p.m. S 10.[illegible]8 8 min.	95% Alcohol	Both tube mills [illegible] were in operation Good ventilation	0.14	10.0	7[illegible].6
7	Working at kettles	Flask held at breathing level, in front of furnaces	June 2, 1936 F 11.30 p.m. S 11.40 10 min.		[illegible] about 2' away [illegible] stream of land plaster [illegible] into cars. Much dust raised by this. Good ventilation.	0.[illegible]	[illegible].3	4[illegible].4
8	Tending buhrstone grinders	Sample taken opposite and 2' from the middle one in a row of buhrstone grinders	June [illegible], 1936 F 9.[illegible] p.m. S 9.40 5 min.		Good ventilation; open window 10' away	0.03	6.[illegible]	.9
9	Chipping buhrstones	Flask held 1' from man chipping buhrstones	June 2, 1936 F 3.[illegible]0 p.m. S 3.10 10 min.		Strong drafts of air through open door 6' away and open window 10' away. Exhaust from air hammer blows chips away from man. Man chips buhrstone 1/4 of time. [illegible] out of time tends buhrstone grinders.	0.04	17.[illegible]	[illegible].[illegible]
10	Working at block machine	Sample collected at breathing level, 1' from block machine, between men working at machine.	June 2, 1936 F 6.00 p.m. S 6.10 10 min.		Fair ventilation	0.0[illegible]	24.[illegible]	[illegible].4

Sample No.	Operation Represented	Location	Date and Sampling Time	Collecting Fluid	Remarks	Particles per cu.ft. of air (in millions): Light Field, above 10µ	Light Field, below 10µ	Dark Field (Plankton Container)
11	Working in board plant at paper rolls	Sample taken on platform holding upper paper rolls, at locations near paper roll and [illegible] tank to represent an average condition.	June 3, 1936 F 10.30 a.m. S 10.20 10 min.	95% Alcohol	Terra alba (land plaster) added to the mix in small lots on this floor. Good ventilation	0.04	9.[illegible]	[illegible]
12	Feeding semi-fluid gypsum to board machine	Sample collected at breathing level, 1' from operator, at place where semi-fluid gypsum is poured on paper sheets.	June 1, 1936 F [illegible] p.m. S 6.[illegible]0 10 min.	"	Good ventilation; open [illegible] away.	0.1[illegible]	19.7	7[illegible]
13	Cutting off Rocklathe boards	Sample taken 2' from machine cutting Rocklathe boards in two, 2' from stand on which boards are stacked.	June 3, 1936 F 11.40 a.m. S 11.30 10 min.	"	Nine men working in this vicinity. Very good ventilation; open window 6' away.	0.04	6.5	1[illegible].1
14	Mixing cement plaster (fibered)	Flask held at breathing level 4' from hopper at about middle of area covered by men.	June 1,1936 F 9.40 a.m. S 9.40 8 min.	"	Two men working near mixer. Fair ventilation; open window and door 30' away.	1.9[illegible]	431.[illegible]	77[illegible].[illegible]
15	Mixing sanded plaster	Sample collected at positions occupied by men filling mixer (near hopper and scales)	June 1, 1936 F 11.40 a.m. S 11.40 8 min.	"	Cover on hopper open most of time. Mixer is below floor level. Little ventilation.	1.9[illegible]	323.1	[illegible]42.7
16	"	Sample taken in front of hopper	June 3, 1936 F 3.46 p.m. S 3.40 6 min.	"	Little ventilation.	1.1[illegible]	360.[illegible]	[illegible]
17	"	"	June 3, 1936 F 3.55 p.m. S 3.10 [illegible] min.	26% Alcohol	Same as sample #14 except that collecting fluid was 26% alcohol	0.1[illegible]	7[illegible].[illegible]	3[illegible].[illegible]

Sample No.	Operation Represented	Location	Date and Sampling Time	Collecting Fluid	Remarks	Particles per cu.ft. of air (in millions) Light Field above 1μ	Light Field below 1μ	Dark Field (Plankton Condenser)
18	Paking cement plaster (fibered)	Flask held at breathing level midway between two men packing cement plaster at Bates packer.	June 1, 1936 F 9.08 a.m. S 9.00 8 min.	95% Alcohol	Machine has exhaust system of dust removal. Two men each loading 3 bags work at packer. Good ventilation; open door 30' away.	2.33	448.1	1067.8
19	Packing sanded plaster	Flask held about 1' from head of man operating Bates packer.	June 1, 1936 F 1.38 p.m. S 1.30 8 min.	"	Machine has exhaust system of dust removal. Little ventilation; open door 40' away.	3.0[illegible]	596.1	2004.7
20	"	"	June 1, 1936 F 2.08 p.m. S 2.00 8 min.	25% Alcohol	Same as sample #19 except that collecting fluid was 25% alcohol.	0.14	6.[illegible]	74.4
21	Packing land plaster in jute bags	Sample collected at breathing level 1 - 2' from man at Bates packer.	June 3, 1936 F 1.50 p.m. S 1.45 5 min.	95% Alcohol	Machine has exhaust system. Open door at back (for convenience of operator in changing bags) renders system rather ineffectual. Little ventilation.	[illegible]	[illegible]	[illegible]
22	Packing plaster of paris in 5 lb. bags	Sample taken between machine packing 5 lb. bags with plaster of paris and machine sewing them.	June 5, 1936 F 1.55 p.m. S 1.50 5 min.	"	Four men work here. Good ventilation.	0.11	46.[illegible]	177.9
23	Sewing burlap bags	Flask held at breathing level 2' from girl sewing bags. Girl 8' away, stamping and wiring bags, exposed to less dust.	June 1, 1936 F 10.30 a.m. S 10.20 a.m. 10 min.	"	No exhaust system of dust removal. Fair ventilation; open window 10' away	1.31	536.8	686.0

Sample No.	Operation Represented	Location	Date and Sampling Time	Collecting Fluid	Remarks	Particles per cu.ft. of air (in millions): Light Field above 10µ	Light Field below 10µ	Dark Field (Pl[illegible] Condenser)
24	Working at Bag wheel.	Sample taken in passageway 15' from closed room where bag wheel was shaking burlap sacks.	June [illegible], 1936 F 4.50 p.m. S 4.40 10 min.	95% Alcohol	Man works part of time filling bag wheel, part of time in passageway when bag wheel is running. Little ventilation; some circulation of air through open door.	0.[illegible]	[illegible]	4[illegible]
25	Working in stucco bin.	Flask held at breathing level, 5' inside stucco bin, close to man scraping stucco into holes in floor.	June 5, 1936 F 1.19 p.m. S 1.15 4 min.	"	Heavy clouds of dust raised occasionally by falling stucco No ventilation. Very hot.	8.07	[illegible],171.[illegible]	1[illegible],6[illegible]
26	Trucking on 3rd floor of warehouse	Sample taken in passageway where electric trucks carrying sacks are passing.	June 4, 1936 F 6.38 p.m. S 6.30 8 min.	"	Bates packer 20' away loading burlap bags. Good ventilation.	0.11	13.[illegible]	[illegible].6
27	Blowing dust out of motors with compressed air.	Flask held close to man blowing out motors (1' away for one-third of sample, 3' away for remainder).	June 4, 1936 F 2.33 3/4 p.m. S 2.30 3 3/4 min.	"	One small and one large motor blown out. Man wears respirator.	10.30	327.7	3[illegible].3
28	In machine shop.	Sample collected at breathing level in middle of machine shop near planer.	June 1, 1936 F 1.54 p.m. S 1.40 14 min.	"	Fair ventilation	0.01	2.[illegible]	9.1
29	In laboratory	Sample taken inside laboratory 5' from door which was nearly closed.	June 4, 1936 F 4.55 p.m. S 4.45 10 min.	"	Good ventilation; open window in opposite wall 20' away.	0.07	5.[illegible]	[illegible]0.3