with water and pebbles. The wind-abraded grain (Fig. 1*a*) is characterized by numerous curved surfaces whose intersections form meandering ridges. Figure 1*b* contains V-shaped patterns as well as irregular pitting. Characteristic features of sand grain surfaces processed in a ball mill are rather prominent conchoidal breakage patterns and blocky textures (Fig. 1*c*). All of these patterns are probably related to the impact velocity of impinging particles.

A sand grain surface from the Michigan-Indiana dunes along the shore of Lake Michigan is shown in Fig. 2*a*. This photograph strongly resembles the artificially wind-abraded sample, and it is characterized by numerous curved surfaces, but it should be noted that the texture of the dune sample is somewhat more rounded than that of the artificially produced wind surfaces. This could be attributed to the difference between the actual and experimental conditions; for example, only one grain size and one wind velocity were used in the artificial wind-abrasion experiments. Figure 2*b* is the surface of a sand grain from the beach at Point Pleasant, N.J., and Fig. 2*c* represents the grain surface of beach sand at La Jolla, Calif.; the similarity of their features and shaking-table textures is apparent.

Combined wind and beach action can be seen in Fig. 2*d*; this is another specimen from the Michigan-Indiana dune area. Curved surfaces, representing wind action, can be noted in the upper part of the photograph, while the lower portion shows typical V-shaped patterns characteristic of beach action. The dunes are located along Lake Michigan, and thus this sand might be expected to contain both beach and dune characteristics. A portion of another beach grain from Point Pleasant (Fig. 2*e*) resembles the barrel sand (Fig. 1*c*) and exhibits blocky texture and V-shaped patterns; however, the former is not often observed.

Kuenen (*5*) has suggested that rounding experiments with a ball mill are more typical of surf action on pebbly beaches than of stream action, and we have assumed that rounding experiments would create surface textures similar to those of natural beach samples. In contrast to his observations, the features on many natural beach specimens rarely resemble the ball mill grains, but are almost identical to the shaking table specimens. Thus, the experiments without pebbles seem to represent a closer approach to natural beach conditions. A ball mill may produce sand representing beach or river conditions where vigorous agitation with pebbles prevails, rather than ordinary beach action.

Therefore, it seems probable that the history of many sand deposits can be identified by electron microscopy and, further, that the use of these techniques might be applied to the study of sand deposits in the geologic record (*6*).

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Tranquilizing Drugs and Pregnancy Tests in Male Batrachia

Abstract. The reactions for the diagnosis of pregnancy by the use of urine from patients who are receiving tranquilizing drugs of the phenothiazine group have given false positive results when performed in the North American frog *Rana pipiens*. Such false positive reactions are not obtained when the South American toad *Bufo arenarum* is used.

Male batrachia have been used with great success for early diagnosis of pregnancy and for diagnosis and control of hydatidiform mole and chorionepithelioma (*1*). This method is more widely used than other biological tests because of the certainty of the results, the simplicity of the technique, and the low cost.

False positive reactions have been reported (*2*) when use is made of urine (but not the serum) from individuals who are receiving tranquilizing drugs. As far as can be determined from the literature, false positive reactions have been observed only in the North American frog *Rana pipiens*, with urine concentrated by the kaolin method.

In order to investigate the relationship between tranquilizing drugs and pregnancy tests with *Bufo arenarum*, the most common species of toad in the vicinity of Cali, Colombia, a study was made with urine from patients of the San Isidro Psychiatric Hospital. All of the patients studied were receiving daily doses of 150 to 800 mg of phenothiazine derivatives (promazine, chlorpromazine, trifluopromazine). No differentiation was made concerning the age or sex of the patients, the psychiatric diagnosis, or associated treatments.

Two series of tests were performed. In the first test, 10 ml of urine was injected directly, with no modification, into the lymphatic dorsal sac of a toad. In this manner 119 tests were performed with urine from 103 patients (54 women and 49 men). The test was repeated for some patients because of changes in the dosage of the drugs. There were no false positive reactions. Five pregnant patients gave positive reactions.

In order to determine if some substance used in the kaolin concentration method (kaolin, NaOH, HCl, phenolphthalein) could be, either alone or mixed with the urinary derivatives of phenothiazine, the cause of the false positive reactions reported with *R. pipiens*, a second series of experiments was carried out with urine concentrated by the kaolin absorption method. By this method 81 tests were made in 59 patients (34 women and 25 men). No false positive reactions were observed. Four pregnant patients gave positive results.

There was no mortality in toads injected with kaolin concentrated urine, but in those injected with unconcentrated urine, mortality was 7.1 percent.

The results suggest that when *Bufo arenarum* is used for pregnancy tests there are no false positive reactions with urine from patients who are receiving phenothiazine derivatives. False positive reactions reported by those who used *R. pipiens* indicate the possibility of some differential factor related to the species of batrachia. It is suggested that the incidence of false positive reactions in other species should be investigated.

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Zinc-65 Levels in Oysters in the Thames River (Connecticut)

Abstract. Levels of zinc-65 in oysters from selected sites in the Thames River (Connecticut) have been determined for a 12-month period. The highest levels of radioactivity were in oysters from a bed situated opposite the United States submarine base in March 1961 (1637 micromicrocuries per kilogram of moist tissue). None of the samples assayed showed sufficient amounts of radioactivity to represent a health hazard.

Perkins and Nielsen (*1*) reported that appreciable quantities of zinc-65 were present in various foods grown along the Columbia River and in individuals who have presumably ingested foods containing zinc-65. Japanese workers (*2*) have made numerous observations of the zinc-65 level in marine organisms.

In a laboratory experiment, Chipman and his co-workers (*3*) investigated the uptake and accumulation of zinc-65 in marine organisms, but their work did not involve a study of low-level zinc-65 already in the environment and organisms.

Murphy *et al.* (*4*) reported that zinc-65 levels in Chesapeake Bay oysters were 124 $\mu\mu$c/kg in March 1958, and 178 $\mu\mu$c/kg in January 1959. Perkins *et al.* (*5*) found that fresh West Coast oysters contained a total of 63,500 $\mu\mu$c/kg of zinc-65 in 1960.

As part of a larger study it was the purpose of the research reported here to determine the concentration of zinc-65 in the oyster (*Crassostrea virginica*) in the Thames River (Conn.) at three selected sites. From knowledge of existing oyster beds, the sites were located as follows: area A, above the United States submarine base; area B, opposite the United States submarine base; area E, below the United States submarine base and opposite the United States Coast Guard Academy.

Oysters have been gathered from one bed at each of these locations every 2 weeks, weather permitting, since May 1960. The organisms have been analyzed for total zinc and for zinc-65 during this period. Estimations of total zinc have been made by the zinc dithizonate colorimetric procedure. These data are recorded in Table 1.

Since zinc-65 content is very low in this area, it was necessary to use the meat from 50 oysters for each sample. The procedure adopted was to remove the meat and weigh it, after draining off the liquid. The pooled meat was dried and ashed, and then the ash was dissolved in nitric acid and centrifuged. The insoluble ash was washed three times with small amounts of nitric acid and centrifuged. Excess ammonium hydroxide was added to the combined acid supernatants, the insoluble hydroxides were separated by centrifugation, and the ammoniacal solution was decanted and saved. The insoluble hydroxides were washed with ammonium hydroxide until no further blue coloration appeared in the supernatant. Hydrogen sulfide was added to the combined ammonium hydroxide supernatants; then the mixture was centrifuged, and the supernatant liquid decanted. The solid sulfides obtained were dissolved in concentrated hydrochloric acid, and the solution was evaporated to dryness. The residue was transferred to culture tubes, and the centrifuge flasks were rinsed with small quantities of 2*N* hydrochloric acid. The contents of the culture tubes were brought to a volume of approximately 5 ml (capacity of well in scintillator crystal) and were assayed for radioactivity. Results of radioactive analysis appear in Table 1.

Concentrations of zinc-65 in the oyster in the Thames River from May 1960 through February 1961 were slightly lower than values reported for Chesapeake Bay oysters (*4*) and were much less than the values for West Coast oysters (*5*).

From March 1961, zinc-65 content in Thames River oysters has been as much as 10 times that reported for Chesapeake Bay oysters but only about 1/40th of the zinc-65 content in West Coast oysters.

Table 1 shows that in March 1961 there appears to have been a peak concentration with a marked reduction for April and a continued decline in May. It is also evident that total zinc does not increase in a corresponding fashion (*6*).

Table 1. Total zinc and zinc-65 content of oysters collected from selected sites in the Thames River. The zinc-65 content is given in micromicrocuries per kilogram of moist tissue.

Date	Area A (above submarine base)		Area B (opposite submarine base)		Area E (below submarine base)	
	Zinc-65 ($\mu\mu$c/kg)	Total zinc (%)	Zinc-65 ($\mu\mu$c/kg)	Total zinc (%)	Zinc-65 ($\mu\mu$c/kg)	Total zinc (%)
23 May 1960	43.1	0.201	47.3	0.173		
6 June 1960	29.7	.185				
5 July 1960	31.2	.150				
1 Aug. 1960					38.3	0.212
25 Aug. 1960			45.5	.160		
29 Aug. 1960	65.0	.174			54.7	.166
13 Sept. 1960	45.2	.163			59.6	.183
27 Sept. 1960	51.6	.163			45.5	.175
11 Oct. 1960	35.1	.193	41.9	.148	46.1	.177
24 Oct. 1960	31.9	.181	49.3	.156	61.3	.208
21 Nov. 1960	41.9	.176	40.2	.159	67.6	.211
20 Dec. 1960	50.9	.241	24.0	.192	17.9	.204
3 Jan. 1961	35.9	.209	33.9	.191	20.7	.202
18 Jan. 1961	46.2	.185	24.4	.188	65.0	.225
13 Feb. 1961			95.1	.148		
16 Feb. 1961	51.8	.223			67.1	.280
1 Mar. 1961	295.2	.224	293.9	.188	141.1	.225
13 Mar. 1961	455.0	.199	694.0	.215	179.9	.230
28 Mar. 1961	1237.7	.197	1637.6	.184	314.8	.217
10 Apr. 1961	1239.3	.181				
12 Apr. 1961			868.6	.170	1061.6	.219
25 Apr. 1961	722.9	.174	766.8	.135	766.7	.198
8 May 1961	628.4	.161	907.1	.147	392.2	.190

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