to remove the meat and then returned to the aquarium, and do not attract any replacements if living oysters are near. Clams (*Mercenaria*) and mussels (*Volsella*), placed in aquaria with *O. impressa* and oysters, do not attract snails; the few that crawl on them do not stay long.

Specimens and records of the Charleston Museum indicate that *O. impressa* is the commonest *Odostomia* in South Carolina; it has been taken from a number of localities by many collectors, starting with Edmund Ravenel prior to 1870. Miner (*3*) and various shell collectors' guides mention that *O. impressa* often occurs on oyster beds. At Bears Bluff, most of the population is found between 1 ft above and 1 ft below mean low-water level. At the beginning of July 1956, the individuals collected ranged from 3.3 to 5.2 mm in height and averaged 4.2 mm. These older snails soon disappeared, and at the end of July they were replaced by a younger group of snails 0.7 to 3.3 mm high, with a mode at 1.5 mm.

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10 August 1956.

Geothermal Survey of Hot Ground Near Lordsburg, New Mexico

In the late fall of 1954, newspapers reported live steam and boiling water issuing from shallow wells being drilled in an area between the Pyramid and the Peloncillo Mountains, 15 miles south-southwest of Lordsburg, N.M. Marx Brook, of the research and development division of the New Mexico Institute of Mining and Technology, made a preliminary examination of the area in December 1954, at which time water samples were collected for analysis. Shortly thereafter it was recommended that a geothermal survey of the area be made.

The locations of three principal wells in the area are shown by solid circles in Fig. 1. These wells penetrate approximately 50 ft of sand and claylike soil underlain by 20 ft of warm-water-bearing gravel. The water-bearing gravel rests on a relatively impervious layer of clay that is approximately 8 ft thick, which in turn covers a hot rhyolite rock. As the drilling operation proceeds through the clay, higher temperatures are encountered, and the water becomes superheated as contact is established with the hot rhyolite.

Two of the three wells were completed at 5 to 10 ft into the rhyolite. One of these behaved like a geyser when it was disturbed by the drilling tools. The third well, which was completed at the upper surface of the rhyolite, can be pumped at the rate of 200 to 300 gal of boiling water per minute.

A geothermal survey was made using resistance thermometers, with the elements installed 1 m below the ground surface. The thermometers were made by installing a thermistor element at the end of a thin (0.25-in. diameter) Bakelite tube, which was subsequently filled with insulating material. Two fine copper wires connect the thermistor to extended leads at the upper end of the tube, where resistance measurements were made with a portable impedance bridge. The thermistor elements at 20°C had a resistance of 18,000 ohm and a sensitivity of approximately 550 ohm per degree centigrade. A hole for receiving the thermometer tube was made by driving a stake 4 ft in length into the ground, and the excess space around the tube was filled with dry sand. This arrangement gave steady-state resistance measurements 30 minutes after installation.

The temperature anomaly is mapped on Fig. 1 with a contour interval of 2°C. Points of temperature observation are indicated by open circles.

The maximum observed temperature at 1 m below the surface was 23°C, approximately 12°C higher than the corresponding readings outside the anomalous region. At one station, a thermistor remained in the ground for 5 days, during which time the air temperature changed from −5°C to +22°C. However, no change in temperature at the 1-m depth was noted during this interval, and in general, during the time of the study, no changes of temperature at this depth were observed. One thermistor has been installed permanently at a depth of 6 m for the purpose of detecting possible changes in ground temperatures at that depth throughout an extended period.

Temperature readings were taken at both 1- and 2-m depths at three locations in the warmest area, and a mean vertical gradient of 10°C/m was determined. Calculations based on a reasonable value of the heat conductivity of the earth material and the observed temperature gradient indicate a power flow of approximately 7500 kw for the area enclosed by the 18°C contour line.

Ranchers of the neighborhood have noticed that the winter snows melt almost immediately over an area approximately 0.5 mile in diameter in the neighborhood of the wells. Distinct changes occur in vegetation at the edges of the thermal anomaly. This is especially striking toward the south end of the area, where the temperature contour lines are close together. On the southeast, creosote bushes begin to grow where the anomaly ends. On the southwest, the hot area cuts through a cotton field. Over the hot area, the cotton stalks grow only 6 in. tall, whereas off the anomaly they attain a height of about 2 ft. Aerial photographs show the outline of the hot region as revealed by changes in vegetation at the edges.

Three hypotheses might explain the origin of the heat: (i) Hot steam and vapors, ascending from great depth along faults and fractures, are the source of heat. (ii) A postrhyolite and relatively recent intrusive has been emplaced beneath the rhyolite and is the source of heat. (iii) The rhyolite is itself the heat source. Since, however, the rhyolite, if correlated with similar rhyolites in adjacent areas, is probably of mid- to late-Tertiary age, it is highly improbable that its original heat could be retained.

It is possible that further study will indicate the true heat source. In the meantime, it would appear desirable to employ modern core-drilling methods, using compressed air, for the purpose of drilling deeper into the rhyolite mass for more significant temperature measurements.

Because of the high thermal gradient, an attempt was made to detect possible potential differences generated by the differential movement of ions in an electrolyte subject to a temperature gradient (Soret effect). Ground potentials owing

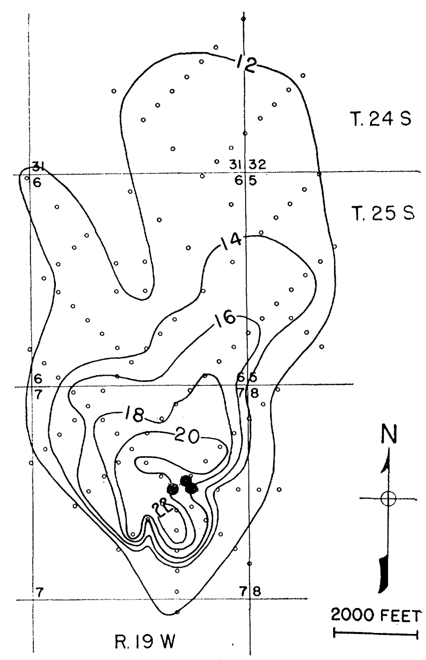

Fig. 1. Geothermal map. Temperature 1 m below surface; contour interval 2°C.

to local variations in soil composition and other sources were too large, however, to permit the recognition of such potential differences.

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Dahllite Identified as a Constituent of Prodissoconch I of Pinctada martensii (Dunker)

Werner (*1*) reported that prodissoconchs (larval shells) of *Mytilus edulis* L., *Macoma baltica* L., *Zirphaea crispata* L., and other species are composed of two parts, prodissoconch I (prod. I), and prodissoconch II (prod. II), named by him, respectively.

Prodissoconch I is the shell that is formed prior to the D-shaped stage. It has radial stripes composed of many fine spots, but it has no concentric growth rings. Prodissoconch II is the shell that is formed around prod. I during the free-swimming stage. Prodissoconch II is markedly distinguished from prod. I by its concentric growth rings.

I found (*2*), in addition, similar configurations in the prodissoconchs of *Pinctada martensii* (Dunker) obtained by artificial fertilization after the method of Kobayashi and Yuki (*3*). About 7 hours after fertilization, fertilized eggs develop into post-trochophores. At the end of this stage (about 20 hours after fertilization), vellum appears, and prod. I begins to develop in accordance with the formation of the shell gland. In about 4 hours, prod. I develops into the D-shaped form. Thereafter, the formation of prod. II takes place. This shell continues to grow until the settled stage is reached. The appearance and growth of prod. II correspond to those of the mantle. It is therefore conceivable that prod. I is formed from the shell gland, and prod. II from the mantle.

Werner ascertained the calcification of both prod. I and prod. II, but no report has appeared concerned with the constituents of prod. I or prod. II. For this reason, I tried to identify these under a polarizing microscope (*4*).

Both prod. I and prod. II are soluble in HCl and HNO_3. Prodissoconch II is colorless and uniaxial negative with very strong birefringence. The refractive indices are $N_O = 1.659$ and $N_E = 1.484$, respectively. Hence, the inorganic part of prod. II is shown to be composed of calcite crystals. In contrast, prod. I is pale green in color and uniaxial negative with very weak birefringence, showing dark gray color under crossed nicols. These characters indicate that crystals of prod. I apparently differ from those of prod. II. The refractive indices are $N_O = 1.633$ and $N_E = 1.612$, respectively. These indices approximately coincide with the Winchels' value (*5*) for dahllite, with 53 mole percent of podolite and 47 mole percent of hydroxyapatite. Therefore, the inorganic component of prod. I must be considered to be dahllite rather than calcite.

For more complete verification, the crystalline form of prod. I and its electron diffraction patterns have recently been examined. (For these purposes, prod. I was not so finely powdered as in the ordinary method, and photographs were taken with a newly built Hitachi superhigh-voltage electron microscope at 200 kv.) The lattice spacings that were calculated from the diffraction patterns agreed fairly well with figures for dahllite given by Roseberry *et al.* (*6*) (see Table 1). With these results dahllite is identified as a constituent of prod. I of *Pinctada martensii.*

Table 1. Electron diffraction data for prod. I of *Pinctada martensii* (Dunker) compared with x-ray data for dahllite.

Prod. I		Dahllite (*6*)	
I	d A	I	d A
S	3.73	2	3.75
vvW	3.36	1.5	3.34
W	3.05	1.5	3.02
m	2.74	10	2.72
vvW	2.64	1	2.60
vW	2.23	2	2.24
vvW	2.11	0.5	2.11
W	1.93	2.5	1.93
vvW	1.86	1.5	1.87
vW	1.84	2.5	1.83
vvW	1.70	0.5	1.71

It is known that mineral components of bones or teeth of vertebrates are hydroxyapatite (or dahllite according to McConnell, *7*), but the existence of dahllite in shells has never been reported. Although shells or pearls contain tricalcium phosphate (Shimizu, *8*, Tanaka and Hatano, *9*, and Stolkowski, *10*), only a trace is present. The mechanism of the dahllite formation has not yet been studied, but a future study is planned.

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References and Notes

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13 December 1955

Correction

In the article "Radiosensitivity factors in oat seeds: dormancy, water and development" [*Science* **123**, 1125 (22 June 1956)], the journal in reference 4 is incorrectly given as *Bot. Rev.*; it should be *Bot. Gazette.*

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Correction

It has been brought to our attention that we did not designate the correct collectors of several of the samples reported in "Lamont radiocarbon measurements III" [*Science* **124**, 154 (27 July 1956)]. The following list gives the proper collectors for several samples in Table 4 under *V. Arctic studies*: L192B, R. D. Cotell (1952); L261A,B,C, G. Hattersley-Smith (1953); L254A, L248A, R. L. Christie (1954); L254B,C,D, E. W. Marshall (1954); and L248B, G. Hattersley-Smith and A. P. Crary (1954).

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