for *Neopilina* (*N.*) *galatheae* Lemche. The six pairs of gills suggest that the animals belong to *Neopilina* (*Vema*) rather than to *Neopilina* (*Neopilina*), but the exact assignment of the specimens to one of the two known species remains uncertain. This uncertainty is due to the fact that the specimens are apparently different in shell sculpture from both *Neopilina* (*Neopilina*) *galatheae* Lemche and *Neopilina* (*Vema*) *ewingi* Clarke and Menzies (*4*).

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References and Notes

1. The net of the biological trawl was nylon with a mesh diameter of 0.5 mm. The position and correction of sonic fathoms was provided by Elizar Uchupi. The cruise was supported by National Science Foundation grant No. 12329 to K. O. Emery of the Geology Department of the University of Southern California.
2. Data regarding the positions of other captures of *Neopilina* are given in a paper by Menzies *et al.* [*Oikos* **10**, 168-182 (1959)]. We understand that a description of the capture of *Neopilina* by the Scripps Institution of Oceanography from the slope off Cape San Lucas, Mexico, is scheduled for publication (information courtesy of Robert Parker, Scripps Institution of Oceanography, La Jolla, Calif.).
3. H. Lemche and K. G. Wingstrand, *Galathea* Rept. **3**, 9–72 (1959).
4. A detailed study of the shell sculpture is in progress. A report is in preparation on the ecological conditions and the fauna associated with the monoplacophorans with the hope that such information will aid our understanding of the ecology of these unusual animals and with the hope that the data will assist in their future capture.

20 April 1961

Molecular Weight Determinations

Abstract. A Beams magnetically suspended equilibrium ultracentrifuge was used to determine the molecular weight of sucrose, ribonuclease, and insulin. Both long- and short-column ultracentifuge cells were used. The longer cells gave greater precision, but required a longer time for equilibrium to occur.

The Beams type magnetically supported equilibrium ultracentrifuge (*1*) has been used to determine the molecular weights of a number of substances, including sucrose, ribonuclease, and insulin. The measurements were made to test the reliability of the apparatus as well as to determine directly the molecular weight values.

For a monodisperse substance in a dilute solution, the molecular weight (M) is given by the relation (*2*):

$$M = \frac{2RT \ln \frac{f_2 c_2}{f_1 c_1}}{(1 - Vd)\, 4\pi^2 N^2 (r_2^2 - r_1^2)}$$

where N is the rotor speed in revolutions per second, T is the temperature, c_1 and c_2 are the concentrations at the radial distances r_1 and r_2, respectively, f_1 and f_2 are the activity coefficients, and V is the partial specific volume. The rotor speed is determined with a precision of 1 part in 10^5, the temperature is measured to at least 1 part in 10^4, and the ratio c_1/c_2 is determined to 1 part in 10^5. The quantities $(1 - Vd)$ and the activity coefficients are measured outside the centrifuge and are the least precisely known of the factors in the equation.

The sucrose was obtained from National Bureau of Standards lot No. 5706 with the solvent triply distilled water. The concentration was determined with a microbalance. The specific refractive increment was measured in this laboratory and is in agreement with the value obtained by interference methods. Chromatographically pure crystalline bovine ribonuclease was obtained from the Sigma Chemical Company. The solvent used was a solution of 0.1M NaCl, 0.035M K_2HPO_4, and 0.004M KH_2PO_4, having a pH of 7.7. A quantity of crystalline zinc-insulin was kindly furnished by Merck, Sharp and Dohme Research Laboratories. The solvent was 0.1M KH_2PO_4 and 0.0033M H_3PO_4 with a pH of 2.8.

Typical results obtained are listed in Table 1. It should be noted that greater accuracy is obtained with the longer cells, but more time is required to reach equilibrium. Consequently, short cells should be used if denaturation occurs during a relatively long experiment (*3*).

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Table 1. Typical results of molecular weight determinations. M_o is the formula weight; M_{obs}, observed molecular weight; t, time required for the experiment, in hours; L, length of the ultracentrifuge cell, in millimeters; c, concentration, in g/100 ml; and N, frequency of the rotor, in rev/sec.

t	L	c	N	M_o	M_{obs}	$(1 - Vd)$
				Sucrose		
22	8	2.990	398.95	342.3	341.9 ± 0.58	0.3761
4	3	2.988	262.10	342.3	343.5 ± 1.40	.3762
				Ribonuclease		
62	8	0.281	174.00	13,663	13,650 ± 23	.3016
14	3	.241	235.96	13,663	13,696 ± 58	.3016
				Insulin		
35	5	.152	306.02		11,427 ± 31	.2606
12	3	.365	267.44		11,517 ± 46	.2606

References and Notes

1. J. W. Beams, *Proc. Am. Phil. Soc.* **101** (1957).
2. T. Svedberg and K. O. Pedersen, *The Ultracentrifuge* (Oxford Univ. Press, London, 1940).
3. We should like to thank J. W. Beams for his help and invaluable advice on this project. The work was supported by a grant from the National Institutes of Health.

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Constitution and Smoking

Abstract. Among 167 adult male factory workers of Neapolitan parentage but of American birth or upbringing, the lean men smoked significantly more than the fat ones. Smoking was positively correlated with serum cholesterol but was not associated with morphological masculinity, blood pressure, diet, or consumption of alcohol.

The detection of determinants of tobacco smoking would help in understanding and possibly preventing diseases associated with smoking, notably lung cancer, emphysema, chronic bronchitis, and cardiovascular disease. The search for constitutional correlates of smoking is being conducted chiefly along psychological lines (*1*). A few investigators (*2–4*) have reported associations of smoking habits with physique and blood pressure, but at borderline levels of significance or with inconsistent direction.

Since the use of tobacco may vary from one cultural group to another, it is desirable to study subjects with a common culture. If, in addition, the subjects have similar biological backgrounds and thus constitute a relatively homogeneous group, any associations found between smoking and other personal characteristics take on added meaning.

Such a group has been under investigation since 1956 (*5*). In 1958 it comprised 167 male factory workers whose parents were born within 75 miles of Naples, Italy; of the men themselves, 151 were born and raised near Boston, Mass., and the other 16 near Naples. Seven of the Italian-born men had been brought to the United States before the age of 10, and nine men had come to this country when they were 10 or older. Of 300 males employed in a single factory (*6*) who met the criteria of age (20 to 59 yr),