We conclude that Fränkel and Jellinek's suggestion of a substituted chitin is incorrect and that *Limulus* almost certainly contains the same chitin units as other arthropods. Accepting this, it follows that all so-called pure chitin used for analytical work contains at least several percent of an unknown contaminant, that in hardened cuticles this may be over 5%, and that in *Limulus* it is considerably more than 10%. The identity of the contaminant is at present only a matter of conjecture. It would be of considerable interest to know whether it is an as yet unrecognized compound[5] or a percentage of one of the known components that is so strongly bound to the chitin that it is not removed by the purification procedure.

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Temperature Measurement inside the Body Using a Thermistor[1]

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In recent years thermistors have been increasingly applied to the measurement of temperature in animal and man (*1, 3*). A thermistor has three important advantages over a thermocouple for measurement of temperature in the body. Due to its high temperature coefficient (–3%/° C) it is approximately ten times as sensitive as a thermocouple, assuming the same order of sensitivity of detecting device. Because of its high impedance (several thousand ohms as compared to a few ohms) lead resistances and switch contact resistances are relatively unimportant; so it is not necessary to take special pains in the wiring of associated circuits. Finally, there is no necessity for maintaining a constant reference temperature.

For these reasons it was decided to incorporate a thermistor as the sensitive element in fine catheters for measuring temperatures inside the animal body. One type of catheter for measuring the temperature inside joint spaces and muscles (*2*) consisted of a radio-opaque plastic tube 0.063 cm OD, 0.036 cm ID, varying in length from 15 cm to 1.5 meters. Catheters of larger diameter have also been made for intracardiac and intravascular observations. The thermistor was placed flush with one end, the lead wires coming out the other end.

The thermistor used for this application was Western Electric Type V597 having the following characteristics:

Diameter	0.4 mm
Temperature coefficient at 38° C	– 3.1 %/° C
Dissipation constant (in still air)	0.1 mm/° C
Thermal time constant (in still air)	1 sec.

Since it was supplied with two 0.025-mm bare platinum leads 8 mm long, it was necessary both to splice these wires to a pair of copper leads, and to insulate the platinum wires and spliced junctions from each other. No. 40 enamel covered copper wire was used for the lead. A connection was effected by wrapping two turns of the platinum wire tightly about the copper lead. A conducting silver paste was then applied to assure satisfactory electrical contact. In order to insulate the two platinum wires from each other, a very fine rayon thread was wrapped tightly along each wire beginning at a point on the copper wire a little below the junction. The whole assembly was then dipped into a bakelite solution, care being taken not to immerse the thermistor bead itself. After the bakelite had been baked, the whole assembly was threaded through the plastic tubing. The end containing the thermistor was then sealed with a small amount of polystyrene, care again being taken not to coat the thermistor bead which protruded a few tenths of a millimeter beyond the end of the tube.

TABLE 1

TEMPERATURE MEASUREMENTS IN THE DOG*

	°F
Superior vena cava	98.9
Coronary sinus	99.0
Right ventricle	99.0
Pulmonary artery	98.8
Inferior vena cava	98.8
Hepatic vein	98.9
Renal vein	98.4
Azygos vein	98.6
Femoral vein	96.8
Femoral artery	98.0
Thigh muscle (2 in.)	96.5
Thigh surface	92.8
Rectal	99.1

* Room temperature 73.0° F.

The unit was connected into a conventional Wheatstone bridge using a Rubicon galvanometer of sensitivity 0.007 μa/mm as an indicating instrument. For recording purposes, the output of the bridge was connected to a pen-writing oscillograph. The overall accuracy of the device was ±0.05° C.

Vascular and other temperatures obtained with the thermistor units are shown in Table 1. The dog was under heavy Nembutal anesthesia. The catheter was passed through the right external jugular vein, and its position was recognized roentgenoscopically.

[1] Aided by a grant to the University of Pennsylvania from The National Foundation for Infantile Paralysis.

[5] The possibility of another type of substituted glucose chain with a side group that would give the same lattice unit dimensions as an acetylated amine group is conceivable.

Similar temperature data have been obtained in various human joints. A 19-gauge hypodermic needle was inserted into the knee joint space. The catheter was threaded through the needle and the needle withdrawn, leaving the thermistor unit in place within the joint. The knee joint temperatures of two normal adult males were found to be 90.3° and 91.2° F respectively, while the surface or skin temperatures were 84° F.

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A Comparative Study of Oyster Condition[1]

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The necessity of providing an objective evaluation of the condition of oysters in ecological investigations has long been recognized by workers in this field. The condition index originally proposed by Hopkins (*1*), which depends upon the measurement of the ratio of dry meat weight to internal shell volume has not been entirely satisfactory for this purpose. Many workers have found considerable variation in this index among oysters from the same region, even where the condition of meat by visual comparison appeared to be relatively constant.

For this reason later workers have adopted the measurement of glycogen content as a supplementary method of evaluation (*2–4*). Since this method appears to yield more consistent results, a study was carried out to determine correlation between condition index and glycogen content.

In all, 30 samples of oysters from various habitats of the Louisiana oyster bayous and four samples from the outside tanks of the U. S. Fisheries Station, Pensacola, Florida, were taken, and each sample was analyzed by both methods.

In arriving at condition index a 10-g aliquot of the ground oyster tissue from 10 oysters was dried at 80° C for 48 hr and weighed. After 15 min in the air it was again dried and weighed to constant weight ±.005 g. The dried weight of the 10 oysters was then calculated and entered into the formula:

$$\frac{\text{Total dry weight in g} \times 100}{\text{Shell cavity volume}} = \text{Index of condition.}$$

Shell cavity volume was obtained by water displacement. Five to 10 g of the same sample of ground oyster meats was digested and the glycogen was hydrolyzed by the Calderwood-Armstrong method (*5*). The Hagendorn-Jensen technique (*6*) for the quantitative determination of glucose followed. To insure against enzymatic action, not more than 3 min was permitted to elapse between grinding the meats in a Waring blender and the digestion of the aliquot in sodium hydroxide.

Fig. 1 shows the correlation between the findings of the two methods. Closer correlation appears to exist among animals of the higher glycogen content and presumably greater vigor. In fact, the correlation coefficient of .69 for the entire group is reduced to .38 if the three samples highest in glycogen are omitted.

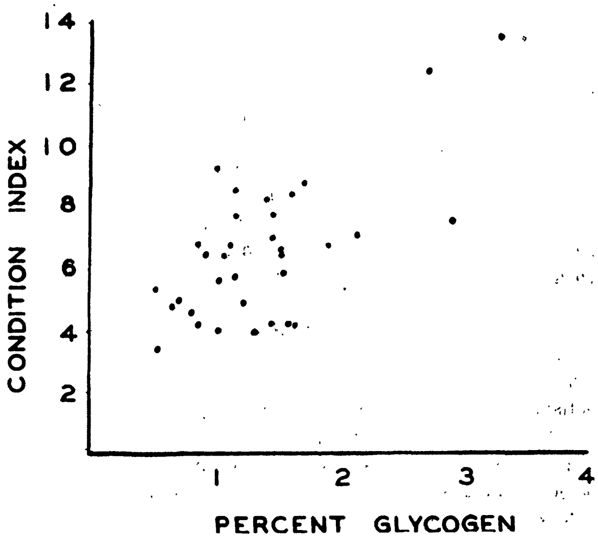

FIG. 1.

It is concluded from these preliminary studies that the poor correlation between the two methods in oysters of low vigor is probably due to dependence of the condition index upon water content, absolute size of meats, and other factors. Because of this, it is believed that glycogen analysis is the most suitable method for the comparison of work carried out by independent investigators on low quality oysters. Further work is under way to determine if a significant correlation exists between the two methods in high quality oysters.

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[1] Facilities and support for this investigation were supplied by the Department of Wildlife and Fisheries of the State of Louisiana.

[2] The author is indebted to Drs. F. G. Walton Smith and H. Malcolm Owen for advice and to Louis A. Bregan, Jr., for technical assistance.