Table 1. Twenty-four-hour distribution of I^{131} in *Triturus* exposed to different salinities of swimming media for 5 days. All groups composed of 20 animals; all figures are percentages.

NaCl added	Activity* retained in whole body 24 hr	Activity† per 100 mg of tail	Activity in total liver	Non-thyroid‡ activity in jaw	Thyroid§ activity in jaw	Thyroid‖ activity in jaw per gram of body wt.
0	80.9	0.94	0.09	1.09	5.40	1.81
0.2	77.9	1.52	0.06	2.44	4.82	1.63
0.4	72.2	1.59	0.25	2.63	4.66	1.62
0.6	66.8	2.06	0.33	3.25	4.36	1.34
0.8	55.1	2.29	0.53	5.19	1.99	0.59

* Whole body I^{131} activity 24 hours following I^{131} administration (less decay) times 100, divided by whole body I^{131} activity (zero time) immediately after I^{131} administration.
† Assayed I^{131} activity in tail portion expressed per 100 mg of tail tissue.
‡ Calculated I^{131} activity of total weight of jaw expressed as I^{131} activity of an equal weight of tail tissue.
§ Assayed I^{131} activity of total jaw less nonthyroid activity in jaw.
‖ Thyroid activity in jaw divided by grams of total body weight.

Table 2. Influence of prior conditioning on the response of *Triturus* to different salinities of swimming media. All groups composed of 20 animals; all figures are percentages.

NaCl added	Activity* retained in whole body 24 hr	Activity† per 100 mg of tail	Activity in total liver	Non-thyroid‡ activity in jaw	Thyroid§ activity in jaw	Thyroid‖ activity in jaw per gram of body wt.
0	82.0	2.00	0.13	2.96	5.21	1.48
0.8	66.2	4.20	0.61	6.70	1.08	0.57

* Whole body I^{131} activity 24 hours following I^{131} administration (less decay) times 100, divided by whole body I^{131} activity (zero time) immediately after I^{131} administration.
† Assayed I^{131} activity in tail portion expressed per 100 mg of tail tissue.
‡ Calculated I^{131} activity of total weight of jaw expressed as I^{131} activity of an equal weight of tail tissue.
§ Assayed I^{131} activity of total jaw less nonthyroid activity in jaw.
‖ Thyroid activity in jaw divided by grams of total body weight.

western Pennsylvania and were maintained prior to use under identical conditions in fresh lake water. All animals were collected within a 2-week period and were used no later than 2 weeks after collection.

Procedures were similar for all groups. Before adjustment of the salinity of the swimming media, all animals were conditioned to filtered, demineralized lake water for 24 hours (less than 5 ppm as NaCl). Individual animals were then placed in adjusted solutions for periods of time as described in a subsequent paragraph. Twenty-four hours prior to sacrifice all animals were injected intraperitoneally with approximately 10 μc of I^{131} in 0.1 ml of 0.7-percent saline. Immediately after injection, each animal was rinsed in distilled water and assayed for total I^{131} (whole body content) by scintillation counting; this procedure was repeated 24 hours later just prior to sacrifice. After correction for radioactive decay, differences between whole body assays of I^{131} were attributed to excretory loss.

Table 3. Response of *Triturus* to 0.8-percent sodium chloride swimming media for different lengths of time. All groups composed of 20 animals.

Time in 0.8% saline (day)	Thyroid* activity in jaw per gram of body wt. (%)	Activity† retained in whole body (%)
1	0.41	71.1
3	0.52	66.2
5	0.59	55.1

* Assayed I^{131} activity of total jaw less nonthyroid activity in jaw.
† Thyroid activity in jaw divided by grams of total body weight.

At sacrifice, each animal was anesthetized with ether and weighed; the lower jaw, total liver, and a portion of the tail were weighed on a torsion balance and assayed for I^{131} by scintillation counting. The excess of the I^{131} jaw activity over the tail aliquot activity per unit weight was attributed to I^{131} accumulation in the thyroid. This activity was expressed as a percentage of the total activity administered.

1) Groups of 20 salamanders were maintained individually in 100 ml of demineralized lake water containing added NaCl (0, 0.2, 0.4, 0.6, or 0.8 percent) for 5 days prior to sacrifice (Table 1).

2) To determine the prior conditioning effect of added salt, two additional groups of 20 salamanders were maintained for a 3-day interval in 0-percent saline and 0.8-percent saline, after which the swimming media were reversed: those in 0 percent saline were placed in 0.8-percent saline, and those previously in 0.8-percent saline were transferred to 0-percent saline solutions. These animals were sacrificed 3 days after the change in their swimming media by the procedure we have outlined (Table 2).

3) Three other groups of 20 animals were sacrificed after 1-, 3-, and 5-day exposures to 0.8-percent NaCl added to the lake-water swimming media (Table 3).

On the basis of the data presented here, it appeared that whole body retention of radioiodine decreased with increased salinity of the swimming media. In addition, I^{131} activity measured in the thyroid in lower jaw by the methods described also decreased with increased salinity of the swimming media and paralleled the decreased retention of I^{131} in the whole animal. Iodine-131 levels of liver and tail tissue increased with increased salinity.

Prior exposure to different saline media did not prevent this response (Table 2). However, animals exposed to 0.8-percent saline swimming media for 1 to 5 days exhibited progressively decreasing amounts of I^{131} retained in the whole body, while the I^{131} thyroid activity tended to recover somewhat during this time (Table 3).

It was concluded that osmotic changes in the swimming media are capable of altering the metabolism of I^{131} in the adult amphibian *Triturus*. Such changes, ecologically, may play a role in seasonal variations of amphibian species.

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Note

1. We wish to acknowledge the use of the facilities of the Pymatuning Biological Field Laboratory of the department of biological sciences of the University of Pittsburgh. Portions of this report were presented at the meeting of the American Physiological Society in Madison, Wis., September 1954.

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Source and Origin of Magnetite at Scott Mine, Sterling Lake, New York

In many metamorphic regions of the eastern United States the rocks contain local concentrations of magnetite. These magnetite bodies are today commonly considered to have been formed by solutions from magmatic sources. The associated host rocks are interpreted to be intrusive igneous bodies, and the ores are believed to be genetically related to these bodies. If, however, the "igneous" rocks are actually metasomatic, then the current theory of the origin of these deposits is no longer valid.

A number of writers have discussed the magnetite deposits of the eastern United States, in particular Bayley, Miller, Colony, and Alling, and more recently Buddington, Leonard, Postel, Hotz, and Sims. The following discussion is restricted to the Scott Mine, but the concepts developed may have application to other mines (*1*).

The Scott Mine is in a region of metamorphic rocks where quartz-oligoclase gneiss, quartz-monzonite gneiss, and pegmatite have replaced pyroxene amphibolite. Evidence of metasomatism includes the following. (i) Foliation in the gneiss passes uninterruptedly into amphibolite inclusions. (ii) Amphibolite inclusions often contain microcline and other minerals of the gneisses or pegmatite. (iii) Thin section analyses of the quartz-monzonite gneiss made by Offield (*2*) show a considerable variation in mineral percentages along the strike. This is more characteristic of different degrees of replacement of amphibolite than it is of intrusive magmatic rock. (iv) Undisturbed long thin layers of amphibolite are present in the gneiss. (v) Evidence of squeezing or displacement to accommodate intrusion of magmatic material is absent. (vi) No *boudinage* structure around amphibolite inclusions was found that would indicate regional plastic deformation rather than metasomatism. (vii) Foliation and lineation of the gneisses have been inherited from the amphibolite; there is no evidence that these gneisses are metamorphosed igneous rocks. (viii) Microtextures are present that are commonly ascribed to replacement processes. Following the metasomatism, magnetite partly replaced the amphibolite layers in a 250-foot-thick ore-bearing zone.

Microscopic studies suggest that the ferromagnesian minerals within the ore-bearing zone were formerly richer in iron than they are now. The refractive indices of biotite, hornblende, augite, and orthopyroxene in the amphibolite decrease with nearness to the ore-bearing layers. This relationship suggests a decrease in iron content of these minerals. Specimens from diamond drill cores through relatively thick ore bodies show, in general, greater decreases in index than do specimens from core with smaller and fewer magnetite concentrations. The indices of orthopyroxene correspond to a composition of from 57 to 100 molecular percent enstatite. A lowering of refractive indices in most mafic minerals is commonly related to a decrease in iron content; however, other elements may be involved. In the Scott Mine the amounts of ferric iron and titanium may be especially significant, but they have not yet been determined.

The relative amounts of each mafic mineral differ somewhat from place to place in the cores. In most specimens, all four ferromagnesian silicates exist together. Therefore, the systematic decrease in indices toward the ore-bearing zones apparently does not reflect a decrease in iron content of one ferromagnesian mineral because of the presence of other mafic minerals, as Nockolds (*3*) found in a study of biotites.

Loss of iron from the ferromagnesian silicates is believed to have been sufficient to supply that necessary for the magnetite bodies. Since chemical analyses have not yet been made, it is not possible to estimate the amount of iron removed from the minerals. However, the ore-bearing zone in which the refractive indices are lowered is sufficiently extensive to warrant this tentative conclusion. From his study at Lyon Mountain in the Adirondacks, Miller (*4*) came to the conclusion that the magnetite was formed in part by a change of hornblende and hypersthene to diallage of lower iron content and in part by solution of magnetite from the country rock. He felt that this was accomplished by late stage intrusive pegmatites. Miller did not substantiate his ideas by sufficient petrographic and chemical data, but the results we have obtained at the Scott Mine suggest that some of Miller's conclusions may have been justified.

Ramberg (*5*) has shown that iron and magnesium ions substitute in different proportions in different types of silicate structures. This may be the result of the fact that the electronegativity of iron is somewhat greater than that of magnesium. Ramberg has further shown that the electronegativity of oxygen in a silicate is less than that of oxygen in an oxide, and accordingly iron will be preferentially taken up in the oxide (magnetite, in this case) and magnesium in the silicate.

If this process took place at the Scott Mine, the iron in the mafic minerals was expelled and became fixed as replacement magnetite. Such a process, controlled by structural features, is believed to have formed the concentrations of magnetite. During metamorphism and metasomatism, differential movement along planar and linear structures produced high and low pressure zones, and iron migrated to the low pressure zones. Plagioclase is the principal mineral that is replaced by magnetite, and each marked increase in magnetite percentage is accompanied by a comparable decrease in plagioclase percentage. The ore bodies are thought to be a phase of the metamorphism and metasomatism of the region.

Other magnetite deposits in metamorphic regions in the eastern United States and elsewhere may have had a similar origin.

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References and Notes

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"Swimming" Anemone from Puget Sound

Extensive dredging operations have been carried out in recent years by the department of oceanography of the University of Washington in a study of the distribution and assemblage patterns of plants and animals in Puget Sound. While dredging was being carried out in an area north of Seattle, collections were made of several specimens of an anemone identified by Cadet Hand of the University of California as *Stomphia coccinea* (*1*). These animals were placed in aquariums that are provided with a constant flow of filtered sea water maintained at a temperature of 10°C, the approximate mean surface water temperature in Puget Sound.

By accident it was discovered that the attached anemones would free themselves and exhibit a spasmodic "swimming" motion in response to immediate contact with certain starfish. Preliminary experimentation showed that the swimming response occurred when one of the following starfish—*Crossaster papposus, Hippasteria spinosa,* or *Dermasterias* sp.—was placed in contact with the anemone, whereas no swimming response occurred when one of the asteroids *Solaster* sp., *Mediaster aequalis, Henricia leviuscula, Pisaster* sp., *Evasterias* sp. or any ophiuroid, was used.

Further investigation showed that the spasmodic swimming response could be produced by placing electrodes one on each side of the column and stimulating the animal with alternating current at 15 to 25 v and 7.5 amp. Sea water containing the mucoid slime of *Dermasterias* sp. also elicited the same response. However, parts of other asteroids gave no positive results—for example, direct contact with the amputated arm of *Crossaster* elicited no response. The swimming action has been photographed on 16-mm Kodachrome film (*2*). Figure 1 is a schematic