TABLE 2

Body	Diameter (cm)	Height (cm)	Orientation of cylinder axis	Force measured in dynes	Computed *EMB* in dynes
Bakelite disk	1.55	0.3			
			$\parallel H$ and $\perp j$	16.1 ± 1.0	15.5
			$\parallel j$ and $\perp H$	12.0 ± 1.0	15.5
Bakelite cylinder	0.53	2.12			
			$\parallel j$ and $\perp H$	13.3 ± 0.5	12.8
			$\perp H$ and $\perp j$	9.4 ± 0.5	12.8
			$\parallel H$ and $\perp j$	1.1 ± 0.5	12.8

90° so that the magnetic lines of force entered its circular faces at right angles, a force $F = 49.0$ dynes was exerted upon it. The force computed from Eq. (9) for a metal sphere of equal volume under the same conditions is 16.7 dynes. In the latter position the disk experiences a torque that tends to set its cylinder axis parallel to the current.

With an elongated Zn cylinder, with dimensions $L = 1.70$ cm, $2R = 0.21$ cm (similar to *a* of Fig. 3), suspended in a solution of $ZnCl_2$, the following results were found: (*a*) When the long side is oriented parallel to the current, $F = 41.0$ dynes; (*b*) when the long side is oriented parallel to the magnetic field, $F = 0$. Force computed for a metal sphere of this volume, $F = 3.88$ dynes.

We see that the force in case (*a*) greatly exceeds the force upon a sphere of equal volume, whereas in case (*b*) it vanishes. The cylinder experiences a torque orienting its axis parallel to the magnetic field, about which it persistently oscillates.

Similar experiments were carried out with dielectric disks and cylinders. Table 2 illustrates the behavior of a disk and of a cylinder at $H = 1857$ oersteds and $j = 0.146$ amp/cm^2.

Table 2 shows that, for certain orientations of the cylinder and of the disk, the force is the same as upon a sphere of equal volume, whereas for others the discrepancy may be quite large, as indicated most strikingly by data on the last line.

The dependence of the force upon the shape and orientation is of importance in considering migration of nonspherical bodies. Such bodies tend to be oriented $\parallel H$ or $\perp H$ in a liquid even at $j = 0$ if their magnetic permeability differs from that of the liquid medium. In addition, we have the orienting torque referred to above at $j \neq 0$.

Use of alternating fields. In order to avoid undesirable electrochemical reactions at the electrodes and at the interface between the solution and the suspended particles, alternating currents have been used in conjunction with an alternating magnetic field. It is desirable that the current be as nearly as possible in phase with the magnetic field. In this case the force will not reverse direction as the magnetic field and the current do so. A reversal of the phase of the current or of the field reverses the direction of migration of the particles.

Some possible uses of this effect. Among the possible applications of this effect might be mentioned the separation of particles of nearly equal density but distinctly different electrical conductivity; for instance, cells of different tissues, algae, bacteria, and possibly viruses. In the case of two kinds of cells of different conductivity, by adjusting the conductivity of the surrounding fluid to an intermediate value, the two species can be made to migrate in opposite directions. Particles of different shapes (e.g., spherules, rodlets, and platelets) may be separated even when their densities, volumes, and electrical conductivities are the same.

The electrical conductivity of irregular bodies and of microscopic particles may be measured by finding the conductivity of a solution in which they experience no electromagnetic force. This offers the possibility of measuring the electrical conductivity of various tissues and of isolated living cells. The electrical stimulation of the cells could be avoided by using alternating fields and currents of sufficiently high frequency.[6] Such observations of variation in the electrical conductivity of active cells would be of interest in studies of changes in cell membrane permeability in response to various stimuli. Similar electromagnetic forces should be observable in high-frequency electromagnetic fields with suspensions in dielectric media.

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[6] The use of high frequencies would also be desirable for the purpose of minimizing cell membrane impedance in measurements of the cell resistance.

Intra-Ocular Hemorrhagic Reaction Induced by Ectoplacental Trophoblast in Hypophysectomized Mice

Clifford Grobstein and Robert O. Scow

National Institutes of Health, USPHS, Bethesda, Maryland

Tubal eggs, whole blastocysts, or isolated ectoplacental trophoblast of the mouse will produce a vigorous hemorrhagic reaction when implanted into the eyes of immature or adult animals of either sex (*1–3*). The occurrence of the reaction in immature and male animals indicates that it does not have the same hormonal requirements as the marked endometrial hyperemia occurring at the normal implantation site. The question may be asked, however, whether the reaction has some other hormonal background that would be disrupted by hypophysectomy.

The ectoplacental region of 8-day C × C3H mouse embryos (early somite stages) was implanted into the right eye of 18 hypophysectomized and 10 normal

C × C3H males. Hypophysectomy was performed at 8 weeks of age, and implants were made 6, 21, and 35 days later into groups of 8, 5, and 5 hypophysectomized and 5, 3, and 2 control animals, respectively. All animals were weighed on the day of hypophysectomy and weekly thereafter. Operated animals lost approximately 15% of their weight during the first week. Subsequently, their weight appeared to stabilize for 2 weeks and then declined slowly for the remainder of the experimental period. Total extirpation of the pituitary gland was achieved in all operated mice, as ascertained by visual inspection (× 9 magnification) of the sella turcica and adjacent tissues, and by body weight data on individual animals.

The reactions of operated and control groups to the trophoblast implant were indistinguishable. In all groups intra-ocular hemorrhage appeared by 48 hr, and the reaction continued to what has been characterized as the ++ level; i.e. the whole eye became dark-red and protuberant, frequently rupturing at the incision site. In animals held longer than 7–10 days the reaction appeared to regress as previously described (*3*).

It is concluded that the intra-ocular hemorrhagic reaction to ectoplacental trophoblast in the mouse is independent not only of the particular hormonal conditions occurring in the female at the time of normal implantation but, since it occurs in full strength in animals 35 days after hypophysectomy, is independent of all hormonal background dependent upon pituitary function.

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Amino Acid Content of Dehydrated Giant African Snails (*Achatina fulica* Bowdich)[1]

Albert R. Mead and Arthur R. Kemmerer

Department of Zoology* and *Department of Nutrition*, *University of Arizona, Tucson

As a part of a plan to make a constructive approach to the serious problem of the giant African snail (*Achatina fulica* Bowdich) in the islands of the Pacific, assays of the essential amino acids were made to determine the possibility of using "snail meal" as a source of animal protein in the feeds of poultry and livestock. To our knowledge, no other tests of this nature have been made on this molluscan pest, although van Weel (*1*), and more recently Garnadi (*2*), have made tests to determine percentages of some of the basic chemical constituents.

The snails were collected alive in the field and submerged in boiling water just long enough to remove the soft parts from the shell. The carcasses were then dehydrated at moderate temperatures and reduced to a fine meal or powder in a Wiley mill. Amino acid assays of this meal were made by procedures previously reported by Kemmerer and Acosta (*3*).[2] The results of these assays are given in Table 1, with the percentages of the amino acids being shown in terms of both the snail meal sample and the total protein content of the snail meal. Unfortunately, samples were not large enough in Lots C and D to determine percentages of threonine and tryptophan.

TABLE 1

AMINO ACID CONTENT OF GIANT AFRICAN SNAIL

Protein content	Lot C		Lot D		Lot E	
	69.9		64.9		61.6	
Amino acid	%, Sample basis	%, Protein basis	%, Sample basis	%, Protein basis	%, Sample basis	%, Protein basis
Arginine	6.46	9.24	8.60	13.25	4.07	6.61
Histidine	0.96	1.38	1.02	1.57	0.99	1.62
Isoleucine	3.15	4.51	3.65	5.62	2.83	4.59
Leucine	3.43	4.91	3.77	5.81	4.64	7.53
Lysine	5.97	8.54	6.48	9.98	3.45	5.60
Methionine	0.70	0.99	0.84	1.29	0.72	1.17
Phenylalanine	2.58	3.69	2.24	3.44	2.43	3.94
Threonine	No values		No values		2.65	4.30
Tryptophan	"	"	"	"	0.38	0.61
Valine	2.97	4.25	3.16	4.87	3.18	5.16

It will be seen that the values of Lots C and D compare quite favorably. In Lot E, however, three of the amino acids show significant departures in their values—viz., arginine, leucine, and lysine. Several factors may enter into a possible explanation of these differences. Specimens in Lot E were collected in Kaneohe, Hawaii, by Philip W. Weber, of the Board of Agriculture, in April 1952 and kept in close confinement for a number of days without food or water. Snails kept under such conditions will very often suffer dietary deficiencies which may possibly be reflected in alterations in the normal basic values of constituent amino acids. Unfortunately, the paucity of research work in the metabolism of terrestrial gastropods does not permit us to determine whether possible starvation or malnutrition could effect a reduction in the levels of arginine and lysine and an increase in leucine. Specimens in Lots C and D, on the other hand, were collected in the Palau Islands (Ngarmalk Island and Ngerebeched, Koror Island, respectively) by Peter J. R Hill in April 1950 and were killed and dehydrated as quickly as possible. Dehydration was accomplished in an improvised plant dryer at a temperature, maintained by a large electric light bulb, held close to 160° F. Yoshio Kondo, of the Bishop Museum, dehydrated the Hawaiian specimens

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[2] Grateful acknowledgment is made to Judith Heimann, who made these determinations.