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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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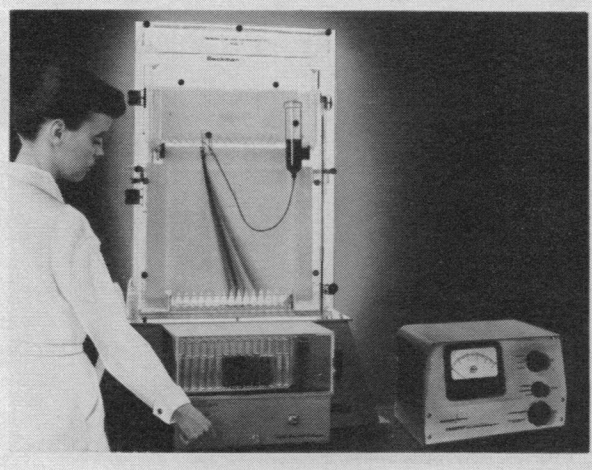

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Sir James Jeans . . . on the quest for knowledge

"Yet we may reflect that physics and philosophy are at most a few thousand years old, but probably have lives of thousands of millions of years stretching away in front of them. They are only just beginning to get under way, and we are still, in Newton's words, like children playing with pebbles on the sea-shore, while the great ocean of truth rolls, unexplored, beyond our reach. It can hardly be a matter for surprise that our race has not succeeded in solving any large part of its most difficult problems in the first millionth part of its existence. Perhaps life would be a duller affair if it had, for to many it is not knowledge but the quest for knowledge that gives the greater interest to thought — to travel hopefully is better than to arrive."

—Physics and Philosophy, 1942

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offer a conclusion more in line with the evidence presented: Certain species of anadromous and catadromous fishes and probably many amphibians have a most interesting life cycle which includes two types of metamorphic change. The first is a preparation for the animal to leave its natal environment, and the second prepares the adult for re-entry into this environment for reproductive purposes. In some of its aspects, this second metamorphosis is the reverse of the first.

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Briggs' letter is kind and generous, up to the peroration, in which it characterizes one of my statements as "sweeping." I hardly know what this means; but I suppose that all generalizations sound odd, until some of them, through reiteration, become familiar; and I have tried to keep my sweepings visible.

When I said that "metamorphosis is a basic and general phenomenon, common to the whole vertebrate stock," I meant in part that the relatively few observations of the kind discussed which have been made, already offer examples ranging from cyclostomes to mammals. In all justice, I meant to imply something more: that these phenomena already appear to be so widespread that whatever lines are eventually drawn to delimit them will have to be rather arbitrary.

Briggs stresses the point that anadromous and catadromous fishes include "probably less than 1 percent of the known species." This percentage is irrelevant; also, the phenomenon is not so limited. Beyond such extreme examples as cited in my paper, one encounters in fishes all degrees of the anadromous and catadromous condition. A. Meek says in his valuable book [*The Migrations of Fish* (Arnold, London, 1916), p. 18]: "Fish which leave the sea to spawn in estuaries only differ in degree from those which spawn just beyond brackish water, and there are fish which may spawn on the coast or in brackish water. So that it may be said all degrees of anadromous migration from mid-ocean to the upper limits of streams may take place and corresponding catadromous migrations. . . ."

Apart, however, from this range of life histories, it is generally agreed that the vast majority of contemporary fishes have migrated, perhaps repeatedly, between fresh waters and the sea during their evolution. A. S. Romer [*Man and the Vertebrates* (Penguin Books, Harmondsworth, Middlesex, 1954), vol. 1, pp. 39–40], for example, thinks that though the fishes as a class arose in fresh water, virtually all teleosts now found in fresh water have probably re-entered that environment from the sea: "The primitive teleosts, as we have suggested, evolved in the sea, and the vast majority of the group still live in salt water. They have, however, returned in considerable numbers to the fresh waters *which were the homes of their ancestors* . . ." (italics mine). It is probably true, therefore, that the great majority of what are now stenohaline fishes have had euryhaline forms in their ancestry, and so might exhibit metamorphic changes associated not only with their own migrations, but recapitulating those of their ancestors.

As for traces of biochemical metamorphosis in stenohaline fishes, Clyde Manwell has recently reported finding distinct embryonic hemoglobins in the spiny dogfish *Squalus suckleyi*, the skate *Raja binoculata*, and the marine teleosts, the sculpin *Scorpaenichthys marmoratus*, and the live-bearing surf-perch *Embiotoca lateralis* [*Physiol. Zoöl.* **31**, 93 (1958); *Science* **128**, 419 (1958); *ibid.* **126**, 1175 (1957)].

Altogether, therefore, Briggs comes perilously close to a sweeping statement in saying that "The vast majority of fishes remain in essentially the same environment into which they are born, having no need for, and showing no evidence of, metamorphic change to prepare the adult for entry into a special natal environment."

Finally, Briggs takes issue with my suggestion that the land vertebrates have not left either metamorphosis or problems of migration wholly behind. I speak of "*residues* of metamorphosis" and "*vestiges* of a second metamorphosis," and say with regard to the latter: "I suppose that puberty is so to be regarded. To be sure, this does not prepare a land vertebrate to migrate, for the natal environment is now segregated, and puberty prepares the animal only to mate." I had said earlier that land vertebrates "have developed two special devices" for pursuing ashore their embryogeny in water: "the boxed-in or cleidoic egg, and viviparity." Are these thoughts different from Briggs' remarks about the development of the amniote egg? And though it may be true that the natal environment of a land vertebrate "almost always" refers to the amniotic fluid, I hope the context of my discussion made it clear that I had included (see Fig. 18 of my article) the environment also of the egg, before and after fertilization.

I think that if Briggs will pursue the phenomena themselves, apart from conventional ways of talking about them, he will find, as I have, that it is difficult indeed to know where to stop.

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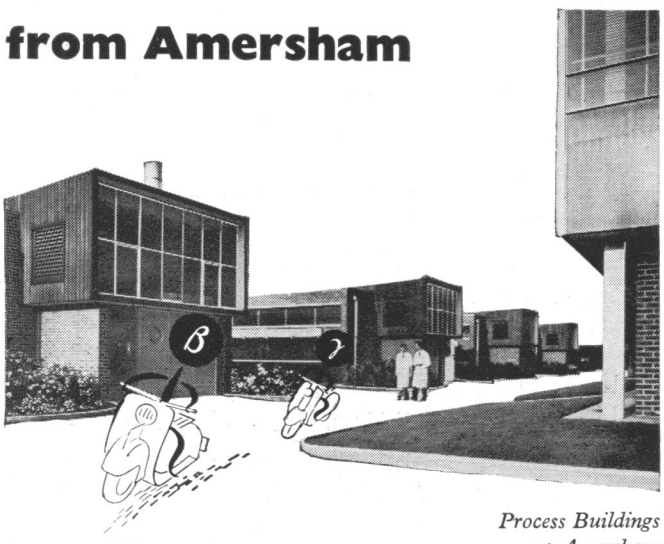

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Meetings

Social Sciences

The newly formed Associazione Italiana di Scienze Sociali, in conjunction with the Centro Nazionale di Prevenzione e Difesa Sociale, held the First National Congress of Social Sciences at the Palazzo Serbelloni-Cabiati in Milan, 31 May to 2 June 1958.

The association was formed about a year ago in response to a felt need for an organization that would facilitate contact among all those who, in various scientific disciplines, concern themselves with the study of society, with special regard to contemporary Italian society and culture.

The congress was divided into two distinct parts. The first (theoretical), on the integration of the social sciences, considered the premises of the various social sciences and the problem of their interdependence; the second (applied), on city and farm areas, dealt with the specific problem of the relation between urban and rural populations, and with research already completed.

The actual proceedings consisted of a presentation of short summaries of papers that had been printed and gathered in a large volume in time for distribution at the congress. Following these summaries, the discussion was opened and took the greater part of the time. This made it possible both to study a paper carefully and to have sufficient time to make a substantial contribution to the discussion.

Speakers and discussants in the first part of the program addressed themselves to the problem of definition and interdependence of the various social sciences and the connection between these and philosophy. Much interest was shown in breaking out of the traditional academic boundaries, and a genuine effort was made to search for a fruitful approach. The debate raged, as was to be expected, around whether "complementarity" or "integration" (fusion) of the disciplines would yield best results. Also discussed at length were the relations of the social sciences to ethics and to philosophy. One of the speakers pointed out that "it seems no longer true that philosophy *tells* the social sciences what *should* be done."

The proceedings of the congress, and papers that were late, will shortly be published in a second volume.

The congress was attended by a large number of people, from Italy and other countries, prominent in such fields as sociology, social anthropology, social psychology, economics, jurisprudence, social medicine, and philosophy.

The president of the association is Renato Treves of the University of Milan. Tullio Tentori, professor at the University of Rome and director of the Museo delle Arti e Tradizioni Popolari of Rome, is national secretary.

RENATO TAGIURI
Graduate School of Business Administration, Harvard University, Boston, Massachusetts

Forthcoming Events

March

24. Admissions Policies to Serve the Needs of the Community, symp., Cleveland, Ohio. (B. G. Fricke, Univ. of Michigan, 120 Rackham Bldg., Ann Arbor.)

27–28. Michigan Acad. of Sciences, East Lansing. (D. A. Rings, Univ. of Michigan, Dept. of Engineering, Ann Arbor.)

27–28. Pennsylvania Acad. of Sciences, Gettysburg. (K. Dearolf, Public Museum and Art Gallery, Reading, Pa.)

28. South Carolina Acad. of Sciences, Columbia. (H. W. Freeman, Dept. of Biology, Winthrop College, Rock Hill, S.C.)

29–3. Association for Childhood Education International, 1959 study conf., St. Louis, Mo. (ACEI, 1200 15 St., NW, Washington 5.)

29–3. Latin American Congress of Chemistry, 7th, Mexico D.F., Mexico. (R. I. Frisbie, Calle Ciprès No. 176, Zone 4, Mexico, D.F.)

30–31. Third Teratology Conf., Portland, Ore. (D. L. Gunberg, Dept. of Anatomy, Univ. of Oregon Medical School, Portland.)

30–1. American Orthopsychiatric Assoc., San Francisco, Calif. (M. F. Langer, 1790 Broadway, New York 19.)

30–12. Bahamas Medical Conf., 7th, Nassau. (B. L. Frank, 1290 Pine Ave., W. Montreal, Canada.)

31–2. American Power Conf., 21st annual, Chicago, Ill. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

31–2. Symposium on Millimeter Waves. 9th, New York, N.Y. (H. J. Carlin, Microwave Research Inst., 55 Johnson St., Brooklyn 1, N.Y.)

31–4. National Science Teachers Assoc., 7th natl. conv., Atlantic City, N.J. (R. H. Carlton, NSTA, 1201 16 St., NW, Washington 6.)

31–5. International Committee of Military Medicine and Pharmacy, 21st session. Paris, France. (Comité International de Médecine et de Pharmacie Militaires, Hôpital Militaire, 79, rue Saint Laurent, Liège, Belgium.)

April

1–3. American Assoc. of Anatomists, Seattle, Wash. (B. Flexner, Univ. of Pennsylvania Medical School, Philadelphia 4.)

1–4. National Council of Teachers of Mathematics, Dallas, Tex. (H. T. Karnes, Dept. of Mathematics, Louisiana State Univ., Baton Rouge 3.)

1–4. National Speleological Soc., 16th annual conv., Springfield, Mo. (O. Hawksley, Route 5, Warrensburg, Mo.)