KOESTLER

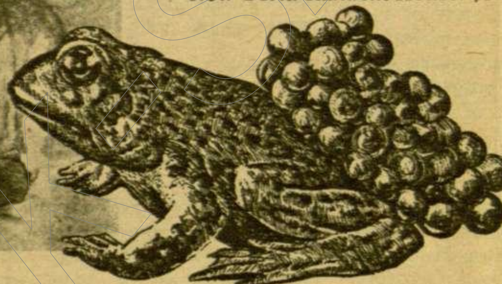
„A bába varangy"

The New York Times Book Review

Can genes learn? Arthur Koestler thinks so

The Case of The Midwife Toad

By Arthur Koestler. Illustrated. 187 pp. New York: Random House. $5.95.



Paul Kammerer, and a midwife toad.

By ROBERT CLAIBORNE

To the biologist and layman alike, there is something perennially seductive about the evolutionary theories of the Chevalier de Lamarck (1744-1819). Their central doctrine —that characteristics acquired by an organism during its life can somehow be passed on to its descendants—promises so many things. Notable among these is a simple rationale for the extraordinary intricacy of living organisms and the elaborate and subtle ways in which they interact with their environment — characteristics which, it is held, could not plausibly have developed out of the random mutations that, according to orthodox biology, provide the raw material of variability on which natural selection acts.

But even apart from filling what is deemed a conceptual gap in evolutionary theory, Lamarckism raises the alluring prospect of human perfectability, the possibility that—in the words of a scientist both distinguished and notorious—"the individual's efforts are not wasted; they are not limited by his own lifespan, but enter into the life-sap of generations. . . . By teaching our children and pupils how to prevail in the struggles of life and attain to ever higher perfection, we give them more than short benefits for their own lifetime. . . ." It is this promise of perfection that helps explain the appeal of Lamarckism to Soviet Communists, final inheritors of the Victorian belief in Progress—an appeal which, with considerable help from Stalin and his secret police, made its Lysenkoist version official Soviet dogma for a generation.

Robert Claiborne has written widely on science and medicine for both professionals and the general public. His most recent books are "Climate, Man and History" and "On Everv Side of the Sea."

In an earlier book, "The Ghost in the Machine," Arthur Koestler already evinced susceptibility to the charms of Lamarckism. In the present work he has been inspired by them to recount the life and death of the early 20th-century Lamarckian, Paul Kammerer, the distinguished and notorious scientist quoted above. The result is an engrossing historico-scientific detective story, an acid commentary on the vaunted "objectivity" of some prominent scientists, and a stimulating—if not wholly convincing—plea for reopening the whole question of Lamarckism to scientific scrutiny.

Kammerer, who flourished in Vienna during the years around World War I, was a figure (to lift a phrase from Claude Cockburn) reeking with 100-proof *Zeitgeist:* prodigy, musician, mountaineer, research zoologist, popular lecturer, lover of beautiful women. After a day in the laboratory, he would go home to compose symphonies; he named his daughter Lacerta after a genus of small lizards. By any standards, Kammerer seems to have possessed extraordinary personal charm, a brilliant if unorthodox scientific imagination and unexcelled experimental skill: the failure of other scientists to duplicate his experiments was often due merely to their lack of his technical virtuosity.

His studies of salamanders, sea squirts and the midwife toad of Koestler's title at the very least demonstrated that the physical characteristics of these organisms could be prodded into undergoing remarkable changes. The toad, for example, is normally a terrestrial animal, and the males lack the "nuptial pads" on their forelimbs which, in related aquatic species, help to grip the female during copulation. But when Kammerer, with great difficulty, hatched the animals' eggs in water, some males developed the pads. These and similar induced changes persisted in subsequent generations, thereby making a prima facie case for their inheritance. Just how strong a case is not clear; one of the few weaknesses of Koestler's narrative is his omission of some key details that would enable us to check on Kammerer's own reasoning.

Assuming, of course, that one accepts as accurate Kammerer's descriptions of his findings. Some of his contemporaries did not. In particular, he drew the fire of the English neo-Darwinian Establishment, headed by William Bateson. A distinguished biologist and a shifty and unscrupulous controversialist, Bateson himself had been a Lamarckian in his youth, but having embraced the true faith of Mendelian-Weismannian Darwinism, he defended it with the fervor—though hardly the probity—of a reformed sinner. Some of his polemics against Kammerer can only be characterized as outright dishonest, involving as they did both *suppressio veri* and *suggestio falsi.*

In 1926, however, shortly after Bateson's death, a scandal broke which seemed posthumously to justify all his venom. G. K. Noble, of the American Museum of Natural History, announced after examining one of Kammerer's midwife toads that the nuptial pads had been faked by injections of India ink; soon after, Kammerer shot himself, thereby seemingly confessing that his experiments had been fraudulent.

The facts, as Koestler shows, are quite different. Nobody has ever offered evidence that any but this single specimen had been tampered with; nor is there any proof that Kammerer had done the tampering. (His suicide note denied it.) Koestler believes, partly on the basis of some fascinating experiments by a biologist friend, that the fake had actually been executed (by person or persons unknown) only weeks before Noble saw it—which is to say, several years *after* the specimen had been examined by a group of English scientists who had seen with their own eyes the pads that Kammerer had sighted. (Bateson, characteristically, failed to show up at that meeting, though he had earlier *demanded* a chance to personally examine the specimen.) Moreover, as Koestler notes, the scientific scandal was probably only a minor element in Kammerer's suicide; like much of the Central European middle class, he had been ruined by inflation, to the point where he had to abandon his beloved research for writing and lecturing, and he was also apparently in the painful, terminal stages of yet another love affair.

Koestler believes that biologists should undertake to repeat Kammerer's experiments (which, he notes, should not be too difficult with the benefit of 60 years' advance in laboratory techniques)—not so much out of justice to Kammerer as in the interests of science. In particular, he believes that they might fill what he considers a major gap in modern evolutionary theory: the source of mutations. And it is at this point that I part company from him.

Koestler cannot accept the random generation of mutations (presumably by external radiation, chemicals and the like) as a credible foundation for evolution. *(Continued on Page 18)*

1972

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Midwife Toad

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"Darwinian selection operating on chance mutations is doubtless a part of the evolutionary picture, but it cannot be the whole picture, and probably not even a very important part of it." His main objection seems to be its alleged improbability as a source of sufficient variations, but his supporting arguments are feeble. He follows C. H. Waddington, for example, in comparing random mutation to "throwing bricks together in heaps" in hopes they will "arrange themselves into an inhabitable house," but the analogy is so inaccurate as to be laughable.

Nor is he any more convincing in citing the view of F. B. Salisbury that "the mutational mechanism as presently imagined could fall short by hundreds of orders of magnitude of producing, in a mere four billion years, even a single required gene." That "could," of course, is the kind of cop-out scientists use when they know they are speculating far beyond the available facts; the statement involves a calculation of probability that neither Salisbury nor anyone else is capable of performing.

On the other side we have the unquestioned fact that mutations are demonstrably occurring all the time—and, so far as we can tell, largely or entirely at random. During my own adult lifetime, furriers have come to stock "mutation mink" in half the colors of the fashion rainbow—yet to the best of my knowledge not one of these tints represents an "acquired" trait of the parent mink; rather, every one of them appeared *de novo* in the newborn pups. Varieties of vegetables and flowers, of which we now have tens of thousands, do not gradually evolve as the plant grows but spring full-blown from a mutant seed. In spite of the biologists' calculations, nature continues to generate new genes in wholesale lots.

The inheritance of acquired characteristics, in short, may or may not be a fact, but it is certainly not a theoretical necessity. Nonetheless, I agree with Koestler that Kammerer's experiments should be repeated—not because they are likely to establish the truth of Lamarckism but because they might well throw light on an even more important biological problem: the "expression" of different genes. As is well known, the cells of higher animals know a great deal more than they are telling, in the sense that only a small part of the genetic information in their chromosomes is actually expressed in the form and function of the individual cell. Cells as different as those of the liver, muscles and nervous system all contain the same genetic information—sufficient in theory to produce a complete new individual.

The question of what influences, internal and external, determine the expression of this or that gene combination and the suppression of all the rest is one of the most important, and least understood, in biology. And from Koestler's brief account of Kammerer's experiments, it seems quite likely that they might provide important clues in this area. Should they do this, they would also provide a measure of rehabilitation to a man who, whatever his stature as a scientist, certainly got a bad deal both from fortune and from some of his colleagues. ■

Youth

Continued from Page 4

just awe, but considerable self-pitying anger. Why am I *for* the Movement, while Rossman is *in* it? How does he manage to be more than a word man? Why, between bouts at the typewriter, do I pace the room or "have" drinks and dinner, while Rossman is out on patrol for the new world, riding pack-horse with Barbarella and the Knights of the Round Table, sensuous pleasure and serious adventure his ever-present companions? It's upsetting to be so easily outpaced, to see the center of one's own life gracefully appended as merely an aspect of someone else's.

Rossman has now collected those messages from his decade on patrol into "The Wedding Within the War," a dazzling, moving book that's made me pace the floor more and have drinks and dinner less. It has flaws, evasions and contradictions, but Rossman freely acknowledges that his "fragments" can't—not this early anyway—be fitted into the kind of systematic coherence those of us with a university training have been taught to admire. Yet the fragments, the bits of experience, are so lucidly and intensely reported that they help to point up the inadequacy of a systematic life: "Granted, I too had those nice warm feelings when we were busted, as much as did anyone; and the martyr's pride did not entirely evaporate in the disgusting tedium of that spring's trial. I have traded on it since, for which I somewhat dislike myself, and will again . . . but by far my main emotion was simple and sheer irritation; *what a drag!*"

Let each event, Rossman implicitly counsels, be experienced as fully as possible for itself, and the connections between events may later follow—not in some over-arching theory of Life, but in the accumulating richness of individual lives. Theorists are frightened of the particular experience; it wreaks havoc with their determination to extract patterns of behavior, to establish conformities. Rossman is frightened of theory—it produces a self-consciousness in advance of any event that shrivels the possible range of response to it.

Yet Rossman in this book is aware that the struggle to free experience from theories about experience is difficult, and in his own case far from complete. He describes himself accurately at one point as a "pop sociologist"; his generalizing impulse *is* strong. But, happily, the poet in him actively resists, tries to get him to register the range and ambiguity of his response to a given moment instead of superimposing a label on it. The poet doesn't win. Neither does the sociologist. His book, his life, can be read as a struggle between the two. When the sociologist is riding triumphant, the book is at its weakest.

Thus his long essay, "The Context of Campus Violence," written in 1969 for Rolling Stone, is the most sterile piece in this collection, "survey journalism" of a competent sort indistinguishable from every third article in Ramparts or Trans-action, stiff with impersonal formulations, an overview that typically eliminates individual variables in order to stress the shared aspects of a given experience. Typically, too, those shared aspects tend to allow for such a low level of generalization that they rarely compensate for the loss of vitality—and the opportunity for empathy—of the individual, singular account.

Much of course depends on who is doing the generalizing and who the personal reporting. In Kenneth Keniston's hands, the contribution of the overview to our understanding of social events is indisputable. Keniston's "Youth and Dissent," a selection of his essays written over the past 10 years for publications as various as The American Journal of Orthopsychiatry, The New York Review of Books, and Life, reiterate the arguments of his two earlier volumes.

The first third of his new book deals with the roots of youthful dissent, the second with some of its defining characteristics — from "dropping out" to drug use—and the last third with what Keniston calls "The Two Revolutions": the now traditional demand that all men be granted access to the prerogatives still monopolized by a few, and the newer revolution of consciousness that seeks fulfillment beyond [...]terial abundance.

Keniston doesn't pretend [...] any comprehensive theory ab[...] the emergence or qualities [...] the advisary youth cult[...] Instead, he views his ess[...] as "building blocks upon wh[...] a theory of the youthful op[...]sition may some day be dev[...]oped." Nor does he have a [...] final judgments to make [...] predictions to offer. His essa[...] leave no doubt that he is ba[...]cally in sympathy with radi[...] youth, but he is "not certa[...] or even optimistic" that [...] promise can be fulfilled — v[...]nerable as the movement is [...] cooptation and repression fr[...] the outside and despair a[...] factionalism from within.

"Youth and Dissent" co[...]tains no flesh and blood peop[...] in its discussions of "dr[...] users," "idealists," "dr[...]outs," et al. But Keniston hasn[...] forgotten that sociologic[...] generalization is only ma[...] possible by the homogenizatio[...] of individual case histories in[...] *a* history. He keeps bringing u[...] the subtle variables in his dat[...] warning us of the diversity [...] his findings.

Now and then Keniston's di[...]tress at having to stand bac[...] and discuss The Generation, in[...]stead of being able to repo[...] the complex special historie[...] that its individual membe[...] have confided to him, seem[...] almost palpable. I sense hi[...] regret that as a "clinician" an[...] "scientist" he can share so lit[...]tle about what for him wer[...] the most charged moment[...] in his interviews with the radi[...]cal young; he seems occasion[...]ally to feel confined by th[...] role he's chosen as dispassion[...]ate observer. He has, however[...] made his choice, and wha[...] he's chosen to do he doe[...] superlatively well.

Rossman hasn't yet chosen. And there seems no compelling reason why he should — other than because of the culture's relentless pressure towards specialization. Why shouldn't the sociologist and the poet co-exist in one man (or book)? Doubtless all sorts of so-called contraries characterize all of us, though we're too timid to give them their play, let alone call public attention to them. Rossman seems to feel equally drawn to the roles of dispassionate observer and passionate participant, and it may be that he can successfully combine them in a way that might usefully demonstrate to us all how foolish we are to internalize our society's confining injunction to do one thing well and forever.

Most of us would probably be pleased if we could achieve an occasional shift of persona and activity — take part in a demonstration one month, write a poem the next, get into a little yoga the third. But Rossman, exemplifying the best