

## Appendix 2

Sir Alister Hardy's aquatic hypothesis stated in the words of the only three accounts he has so far published.

### Statement 1

This is the account given in *The New Scientist*, Vol. 7, pages 642-45, April, 1960. It appeared as follows:

### WAS MAN MORE AQUATIC IN THE PAST?

And was it in the sea that man learned to stand erect? The author explains his hypothesis that we descend from more aquatic ape-like ancestors.

By Professor SIR ALLISTER HARDY, FRA.

On 5 March I was asked to address a conference of the British Sub-Aqua Club at Brighton and chose as my theme "Aquatic Man: Past, Present and Future." I dealt little with the present, for Man's recent achievements in the underwater world were so well illustrated by other speakers and by films. I ventured to suggest a new hypothesis of Man's origins from more aquatic apelike ancestors and then went on to discuss possible developments of the future. I did not expect the wide publicity that was given to my views in the daily press, and since such accounts could only be much abbreviated, and in some cases might be misleading, I gladly accepted the invitation of *The New Scientist* to give a fuller statement of my ideas.

I have been toying with this concept of Man's evolution for many years, but until this moment, which suddenly appeared to be an appropriate one, I had hesitated because it had seemed perhaps too fantastic, yet the more I reflected upon it, the more I came to believe it to be possible, or even likely. In this article I shall deal with this hypothesis; next week I shall treat of the future.\*

Man, of course, is a mammal, and all the mammals have been derived, as indeed have also the birds but by a different line of

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\* In the second article the author developed his future would ideas as to how sub-aqua man in the future would revolutionize the fishing industry.

evolution, from reptile ancestors that flourished more than a hundred million years ago, when the world was populated by saurians of so many different kinds which have long since become extinct. These reptile ancestors in turn were derived from newt-like animals-amphibian creatures-which had only partially conquered the land and had to return to water to breed as do most of our salamanders and frogs of today. It is equally certain that these earlier amphibians were evolved from fish which, like those primitive lung-fish that still survive in certain tropical swamps today, had developed lungs with which to breathe. Some of these air-breathing fish were able to climb from the water on to the land. This history of the emancipation of animal life from the sea is well known. I repeat it only because it forms the background to another story, one that is not quite so familiar to those who are not trained as zoologists. At the same time as this conquest of the land was extending with continuously improving adaptations to the new terrestrial life, we see (in the fossil record) a different act repeating itself again and again, first with the amphibians, next with the reptiles, and then with the mammals and indeed the birds as well. Excessive multiplication, population, shortage of food, resulted in some members of each group\*\*, being forced back into the water to make a living, because there was not enough food for them on the land. Among the reptiles I need only remind you of the remarkable fish-like ichthyosaurs, of the plesiosaurs, of many crocodile-like animals, and of turtles, not to mention water-snakes.

Then, among the mammals of today we see the great group of whales, dolphins and porpoises, with the vestigial remains of their hind legs buried deep in their bodies, beautifully adapted to sea life; or again the dugongs and manatees belonging to an entirely different order. The seals are well on their way to an almost completely aquatic life, and many other groups of mammals have aquatic representatives which have been forced into the water in search of food: the polar bears, the otters (both freshwater and marine), various aquatic rodents, like water voles and the coypus, or insectivores like the water shrew; and, of course, we must not forget the primitive duck-billed platypus.

There are, indeed, few groups that have not, during one time or another in the course of evolution, had their aquatic representatives; among the birds the penguins are the supreme

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\*\*The amphibians went back only into fresh water (for certain physiological reasons) not into the sea.  
examples.

The suggestion I am about to make may at first seem farfetched, yet I think it may best explain the striking physical differences that separate Man's immediate ancestors (the Hominidae) from the more ape-like forms (Pongidae) which have each diverged from a common stock of more primitive ape-like creatures which had clearly developed for a time as tree-living forms.

My thesis is that a branch of this primitive ape-stock was forced by competition from life in the trees to feed on the seashores and to hunt for food, shell fish, sea-urchins, etc., in the shallow waters of the coast. I suppose that they were forced into the water just as we have seen happen in so many other groups of terrestrial animals. I am imagining this happening in the warmer parts of the world, in the tropical seas where Man could stand being in the water for relatively long periods, that is, several hours at a stretch. I imagine him wading, at first perhaps still crouching, almost on all fours, groping about in the water, digging for shell fish, but becoming gradually more adept at swimming. Then, in time, I see him becoming more and more of an aquatic animal going further out from the shore; I see him diving for shell fish, prising out worms, burrowing crabs and bivalves from the sands at the bottom of shallow seas, and breaking open sea-urchins, and then, with increasing skill, capturing fish with his hands.

Let us now consider a number of points which such a conception might explain. First and foremost, perhaps, is the exceptional ability of Man to swim, to swim like a frog, and his great endurance at it. The fact that some men can swim the English Channel (albeit with training), indeed that they race across it, indicates to my mind that there must have been a long period of natural selection improving Man's qualities for such feats. Many animals can swim at the surface, but few terrestrial mammals can rival man in swimming below the surface and gracefully turning this way and that in search of what he may be looking for. The extent to which sponge and pearl divers can hold their breath under water is perhaps another outcome of such past adaptation.

It may be objected that children have to be taught to swim; but the same is true of young otters, and I should regard them as more aquatic than Man has been. Further, I have been told that babies put into water before they have learnt to walk will, in fact, go through the motions of swimming at once, but not after they have walked.

Does the idea perhaps explain the satisfaction that so many people feel in going to the seaside, in bathing, and in indulging in various

forms of aquatic sport? Does not the vogue of the aqua-lung indicate a latent urge in Man to swim below the surface?

Whilst not invariably so, the loss of hair is a characteristic of a number of aquatic mammals, for example, the whales, the Sirenia (that is, the dugongs and manatees) and the hippopotamus. Aquatic animals which come out of the water in cold and temperate climates have retained their fur for warmth on land, as have the seals, otters, beavers,, etc. Man has lost his hair all except on the head, that part of him sticking out of the water as he swims; such hair is possibly retained as a guard against the rays of the tropical sun, and its loss from the face of the female is, of course, the result of sexual selection. Actually the apparent hairlessness of Man is not always due to an absence of hair; in the white races it is more apparent than real in that the hairs are there but are small and exceedingly reduced in thickness; in some of the black races, however, the hairs have actually gone, but in either case the effect is the same: that of reducing the resistance of the body in swimming. Hair, under water, naturally loses its original function of keeping the body warm by acting as a poor heat conductor; that quality, of course, depends upon the air held stationary in the spaces between the hairs-the principle adopted in Aertex underwear. Actually the loss or reduction of hair in Man is an adaptation by the retention into adult life of an early embryonic condition; the unborn chimpanzee has hair on its head like Man, but little on its body.

While discussing hair it is interesting to point out that what are called the "hair tracts"-the direction in which the hairs lie on different parts of the body-are different in Man from those in apes; particularly to be noted are the hairs on the back, which are all pointing in lines to meet diagonally toward the mid-line, exactly as the streams of water would pass around the body and meet, when it is swimming forward like a frog.

Such an arrangement of hair, offering less resistance, may have been a first step in aquatic adaptation before its loss.

The graceful shape of Man-or woman!-is most striking when compared with the clumsy form of the ape. All the curves of the human body have the beauty of a well-designed boat. Man is indeed streamlined.

These sweeping curves of the body are helped by the development of fat below the skin and, indeed, the presence of this subcutaneous fat is a characteristic that distinguishes Man from the other primates. It was a note of this fact in the late Professor Wood Jones's book *Man's Place among the Mammals* that set me

thinking of the possibility of Man having a more aquatic past when I read it more than thirty years ago. I quote the paragraph as follows:

“The peculiar relation of the skin to the underlying superficial fascia is a very real distinction, familiar enough to everyone who has repeatedly skinned both human subjects and any other members of the Primates.

The bed of subcutaneous fat adherent to the skin, so conspicuous in Man, is possibly related to his apparent hair reduction; though it is difficult to see why, if no other factor is invoked, there should be such a basal difference between Man and the Chimpanzee.”

I read this in 1929 when I had recently returned from an Antarctic expedition where the layers of blubber of whales, seals, and penguins were such a feature of these examples of aquatic life; such layers of fat are found in other water animals as well; and at once I thought perhaps Man had been aquatic too. In warm-blooded water animals such layers of fat act as insulating layers to prevent heat loss; in fact, in function they replace the hair. Man, having lost his hair, must, before he acquired the use of clothing, have been subjected to great contrasts of temperature out of water; in this connection it is interesting to note the experiments carried out at Oxford by Dr. J. S. Weiner, who showed what an exceptional range of temperature change in air Man can stand, compared with other mammals. Man's great number of sweat glands enable him to stand a tropical climate and still retain a large layer of fat necessary for aquatic life.

This idea of an aquatic past might also help to solve another puzzle which Professor Wood Jones stressed so forcibly, that of understanding how Man obtained his erect posture, and also kept his hands in the primitive, unspecialized, vertebrate condition; for long periods, the hands could not have been used in support of the body as they are in the modern apes, which have never mastered the complete upright position.

The chimpanzee slouches forward with his body partly supported by his long arms and with his hands bent up, to take the weight on the knuckles. Man must have left the trees much earlier; in all the modern apes the length of arm is much longer than that of the leg. In Man it is the reverse. The puzzle is: how in fact did Man come to have the perfect erect posture that he has-enabling him to run with such ease and balance? Some have supposed that he could actually have achieved it by such running, or perhaps by leaping, but this does not seem likely. Let me again quote from Wood Jones, this time from his book *The Hall-marks of Mankind*, 1948, p. 78:

“Almost equal certainty may be attached to the rejection of the possibility that he ever served an apprenticeship as a specialized leaper or a specialized runner in open spaces. But it is by no means so easy to reject the supposition that he commenced his career of bipedal orthograde progression as what might be termed a toddler, somewhat after the fashion followed in some degree by the bears.” It seems indeed possible that his mastery of the erect posture arose by such toddling, like children at the seaside. Wading about, at first paddling and toddling along the shores in the shallows, hunting for shell-fish,

Man gradually went further and further into deeper water, swimming for a time, but having at intervals to rest—resting with his feet on the bottom and his head out of the surface: in fact, standing erect with the water supporting his weight. He would have to raise his head out of the water to feed; with his hands full of spoil he could do better standing than floating. It seems to me likely that Man learnt to stand erect first in the water and then, as his balance improved, he found he became better equipped for standing up on the shore when he came out, and indeed also for running. He would naturally have to return to the beach to sleep and to get water to drink; actually I imagine him to have spent at least half his time on land.

Tied up with his method of assuming the erect position is the problem of the human hand. Let me again quote from Wood Jones (*ibid.*, p. 80): “In the first place, it seems to be perfectly clear that the human orthograde habit must have been established so early in the mammalian story that a hand of primitive vertebrate simplicity was preserved, with all its initial potentialities, by reason of its being emancipated from any office of mere bodily support. Perhaps the extreme structural primitiveness of the human hand is a thing that can only be appreciated fully by the comparative anatomist, but some reflection on the subject will convince anyone that its very perfections, which at first sight might appear to be specializations, are all the outcome of its being a hand unaltered for any of the diverse uses to which the manus of most of the “lower” mammals is put. Man’s primitive hand must have been set free to perform the functions that it now subserves at a period very early indeed in the mammalian story.”

Man’s hand has all the characters of a sensitive, exploring device, continually feeling with its tentacle-like fingers over the sea-bed: using them to clutch hold of crabs and other crustaceans, to prise out bivalves from the sand and to break them open, to turn over stones to find the worms and other creatures sheltering

underneath. There are fish which have finger-like processes on their fins, such as the gurnards; they are just such sensitive feeding organs, hunting for food, and they, too, have been known to turn over stones with them while looking for it.

It seems likely that Man learnt his tool-making on the shore. One of the few non-human mammals to use a tool is the Californian sea otter, which dives to the bottom, brings up a large sea-urchin in one hand and a stone in the other, and then, while it floats on its back at the surface, breaks the sea-urchin against its chest with the stone, and swallows the rich contents. Man no doubt first saw the possibilities of using stones, lying ready at hand on the beach, to crack open the enshelled "packages" of food which were otherwise tantalizingly out of his reach; so in far-off days he smashed the shells of the sea-urchins and crushed lobsters' claws to get out the delicacies that we so much enjoy today. From the use of such natural stones it was but a step to split flints into more efficient tools and then into instruments for the chase. Having done this, and learnt how to strike together flints to make fires, perhaps with dried seaweed, on the sea-shore, Man, now erect and a fast runner, was equipped for the conquest of the continents, the vast open spaces with their herds of grazing game. Whilst he became a great hunter, we know from the middens of mesolithic Man that shell fish for long remained a favorite food.

In such a brief statement I cannot deal with all the aspects of the subject; I shall later do so at greater length and in more detail in a full-scale study of the problem. I will just here mention one more point.

The students of the fossil record have for so long been perturbed by the apparent sudden appearance of Man. Where are the fossil remains that linked the Hominidae with their more ape-like ancestors? The recent finds in South Africa of *Australopithecus* seem to carry us a good step nearer to our common origin with the ape stock, but before then there is a gap. Is it possible that the gap is due to the period when Man struggled and died in the sea? Perhaps his remains became the food of powerful sea creatures which crushed his bones out of recognition; or could his bones have been dissolved, eroded away in the tropical seas? Perhaps, in time, some expedition to investigate tropical Pliocene (coastal) deposits may yet reveal these missing links.

It is interesting to note that the Miocene fossil *Proconsul*, which may perhaps represent approximately the kind of ape giving rise to the human stock, has an arm and hand of a very unspecialized form: much more human than that of the modern ape. It is in the

gap of some ten million years, or more, between *Proconsul* and *Australopithecus* that I suppose Man to have been cradled in the sea.

My thesis is, of course, only a speculation-an hypothesis to be discussed and tested against further lines of evidence. Such ideas are useful only if they stimulate fresh inquiries which may bring us nearer to the truth.

### Statement 2

This is the text of a broadcast talk on the Third Programme (as it was then called) which was published in *The Listener* of May 12, 1960, under the title "Has Man an Aquatic Past?" As most of it is a repetition, in slightly different words, of what appeared in *The New Scientist* article just quoted, only a few short paragraphs of somewhat different material are here reproduced.

. . . Many animals can swim at the surface if they are forced to, but few terrestrial animals can swim below the surface as man can, or can gracefully turn this way and that to pick up what he is looking for. Native boys diving for coins in a foreign port do indeed look as if they were truly aquatic animals. . . !

Several people have asked me why, if Man has had a long enough evolution in the water to produce such characters as loss of hair and subcutaneous fat, he has not also got webbed hands and feet. Regarding the development of hands, I am sure that selection would not favor such mutations, for his separated fingers would be of greater value in finding and dealing with marine food. But regarding the feet, the truth is that some people have their toes webbed but they do not like to talk about it!

In 1926, Basler examined 1,000 schoolchildren and found that 9 percent of boys and 6.6 percent of girls had webbing between the second and third toes; and in some the webbing may extend between them all. But apart from the toes the whole foot of Man differs from that of the ape in that the big toe is joined to the others. This connection is absent in the apes. It looks as if the human foot may have gone a little way in the direction of webbing but was later modified for running, and you will remember that I have supposed that Man was only partly aquatic and, for at least part of the time, would be walking on the shore.

Students of the fossil record have long been puzzled at the sudden appearance of Man. The earliest fossil Man, the *Australopithecus*, is definitely Man, as is shown by the pelvic girdle which is human and not ape-like: he must have had the erect posture. Before that, there

is a great gap in time, right back to the fossil ape, *Proconsul*, in the middle of the Miocene. Throughout the whole Pliocene no human remains have been found, unless we include the doubtful *Oreopithecus*. I would suggest that perhaps this gap represents the period when Man struggled and died in the sea. Perhaps there are no coastal tropical *Pliocene* deposits available; they may have been submerged below the sea.

I have been speaking all the time as if Man was only marine in this semi-aquatic condition, but he may well have also invaded the rivers, lakes, and swamps, and so we may yet find his remains in such circum-stances.

The remains of *Australopithecus* were found in caves, but, not far from the caves, there are said to be deposits indicating dried-up lakes or inland seas; so perhaps *Australopithecus* himself was still associated with water.

### Statement 3

This is a popular and somewhat light-hearted article written for *Zenith*, the magazine of the Oxford University Scientific Society, which is mainly an undergraduate concern; it appeared in 1977 in Vol. 15, No. 1, pp. 4-6, under the title "Was there a *Homo aquaticus*?"

Again, a good deal of this article is covering the same ground as that written for the *New Scientist* given above in full under Statement 1.

The following are selected passages that either add some new concepts or give greater emphasis to certain points that were only briefly touched upon in the earlier communications; they represent the author's most recent expression of his views.

. . . Whilst there can be little doubt that man is descended from arboreal ancestors, it is also certain that he came down from the trees at a very early period before his arms became too highly specialized for swinging from bough to bough; he came to feed on the ground. Now here is another important difference between man and the rest of the primates: the latter are essentially vegetarian feeders, living largely on fruits, but with one exception; man alone became a carnivore—the exception being a monkey, the so-called crab-eating macaque, which is now doing just what I believe man did so long ago, going out onto the shores and actually swimming to collect crabs and other crustaceans for food.

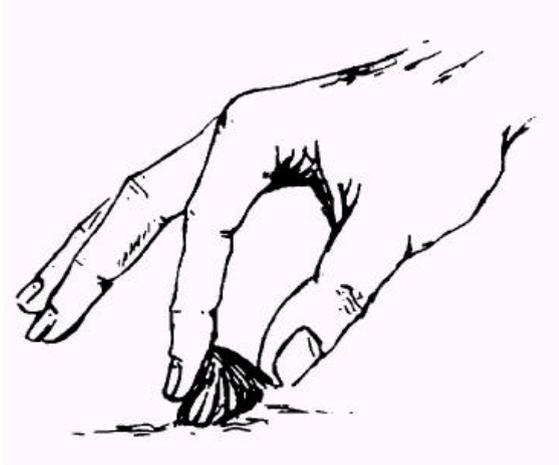
We know that man's immediate ancestors were hunting on the land in packs with a leader, like hunting dogs or wolves, and for a time they were very largely carnivorous; the semi-aquatic phase I am

envisaging took place long before this. It was here, I believe, that man made that remarkable transition from a fruit-eating diet to one of flesh. How like fruits were the succulent bi-valves that he collected as the tide went out!

But that was only the beginning. He became a shellfish eater on a grand scale, and not only of molluscs but crustacea and many other creatures.

Competition for food sent him further and further out into the water picking up food from the sea-bed. It was here that he learned to stand upright. We see the same thing happening in the behavior of monkeys in Japan being trained to feed in the sea—they do indeed adopt the erect posture, the water giving their bodies support; man first groped for food on the bottom in shallow water, but stood up to eat it.

The human hand is a remarkable piece of equipment for the picking up of objects between thumb and forefinger (fig. A) and also



adapted, I believe, for groping for and seizing living food on the sea-bed. A mammal that has remarkable human-like fingers on its fore-limbs is the American raccoon which habitually sits by the edge of a stream with its hands in the water feeling about for crayfish or other prey on the bottom.

Figure A Thus I believe natural selection developed man's remarkable

hands, combining the forceps-like finger and thumb for picking up small objects, together with a trap-like cage of fingers for capturing fish and other moving prey. So he went further and further out to sea, swimming from one good fishing ground to another.

. . . We can easily see how natural selection could lead to the reduction of hair for it is reported that the Sydney University Swimming team shave off all their body hair before a race and by this save a second in a hundred-yard swim; as groups of our ancestors swam in the tropical seas, chased by sharks, it was the more hairy that tended to lag behind and so become a prey to the voracious jaws. Gradually hair was eliminated except on the head and under the arm pits and in the region of the groin; ladies who for aesthetic reasons shave the hair from their arm pits, suffer considerable discomfort when bathing in that skin tends to

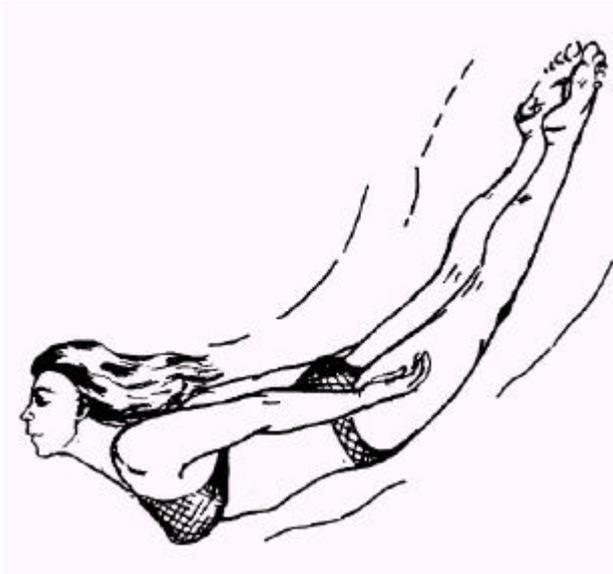


Fig. B.

rub or stick together, because they have removed the cushion of hair which nature left to prevent this at the junction of limb and body.

Now look at the remarkable stream-line shape of the human form in fig. B; how different from any other of the primates are the beautiful curves of the body helped incidentally by the layers of subcutaneous fat—they are like the curves of a boat, so loved by many men.

The rounding of the human jaw, fig. C, unique among the primates, has always been a puzzle to anatomists: it is shaped like the jaws of a frog.

I think it likely that man began to use stones for breaking open the shell-fish, etc., as does the Californian sea otter; and stones are so readily available on the shore. Now let us imagine that on a particular shore man was hammering with a stone and he

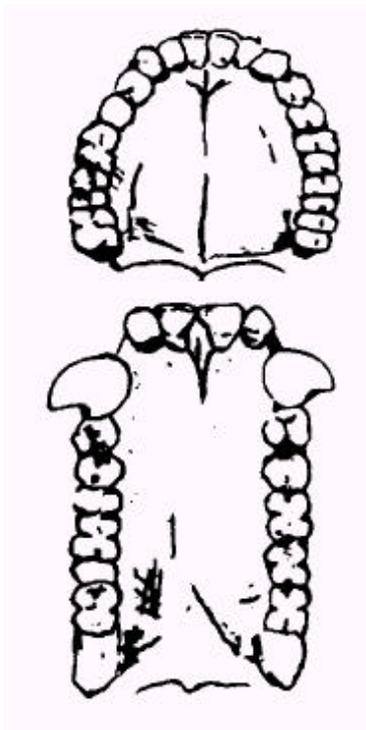


Fig. C

suddenly found the stone split into thin flakes—flakes of flint—one could almost imagine him crying out with excitement: “Boys -a knife!” but of course he could not speak in that distant age, nor would he know what a knife was, but he could at once see the great advantage of these sharp blades of flint. He began not just to use any old stone but to make stone tools like knives and spear heads. He now began to hunt larger marine creatures, spearing large fish, which he could not have caught before, then perhaps even porpoises.

So he became a hunter in the sea. Then once he had got his skill and the implements to make it possible, he looked toward the herds of deer and antelopes grazing on the land and he realized that he

now had the means of obtaining food in greater quantity, and without all the discomfort of hunting in the sea.

So after some twenty million years or more of living a semi-aquatic life-I must make it clear that I do not suppose man spent more than perhaps five or six hours in the water at a time-Homo aquaticus left the sea (or lake) a very different creature from when he first entered it.

Now with a hairless body, subcutaneous fat giving him a shapely form, a knowledge of making and using tools, and, above all, the erect posture, he might well be called a new species of man: indeed the ancestor of *Homo erectus*. His feet have always been a compromise between swimming organs and those adapted for running. About this time, I imagine, in fashioning flints he saw the sparks fly which led him to make fires of dried seaweed and driftwood along the beach; he was now equipped to cook the fish he caught.

Perhaps it was not only a shortage of food that sent man to the water in the first place, but also a means of escaping from powerful predators: possibly *Homo aquaticus* was only able to survive and evolve with the help of a number of small sandy or rocky islands stretching up the tropical coasts or margins of lakes where he could live in large colonies, like those of seals or penguins, and where his only enemies were sharks and killer whales in the sea or crocodiles in lakes and rivers.

The only previous publication of my hypothesis was my article in the *New Scientist* of April 1960, and only then was I forced to publish it to protect myself from the outrageous distortions of my views that appeared unexpectedly in the national press. For thirty years I kept the idea to myself, always waiting for the fossil evidence which I felt must surely come. In March 1960, however, I was invited to address a big conference organized by the British Sub-Aqua Club in Brighton and I thought it might be an appropriate moment to try out my ideas, imagining that it would not be reported further than the local *Brighton Argus*. I had not realized that the press of the world was there. My speech was on the Friday evening. Almost every Sunday newspaper came out with banner head-lines such as "Oxford Professor says man is a sea ape!"; some, like the *Sunday Times* and *The Observer*, gave a reasonable summary of my views, but most others were wildly inaccurate. To illustrate a point I had naturally been talking about aquatic mammals like the dolphin, so one paper excitedly declared "Professor Hardy's startling new theory shows man to be descended from a dolphin." I hardly dared to go back to Oxford on the

Monday. However, I telephoned the editor of the *New Scientist* to ask if they would publish a more reasonable account of my hypothesis: it came out a fortnight later. I was then asked to give a talk on Radio 3 which was published in *The Listener*. Apart from that I have published nothing further. Desmond Morris devoted a page or two to my ideas in *The Naked Ape* in 1967. He very nearly came down in favor of it, but then decided otherwise, although he went on to say:

“Even if eventually it does turn out to be true, it will not clash seriously with the general picture of the hunting ape’s evolution out of a ground ape. It will simply mean that the ground ape went through a rather salutary ‘christening ceremony’.”

That discussion by Desmond Morris triggered off that well known and witty writer, a former Oxford (Lady Margaret Hall) scholar, Elaine Morgan, to take up the idea and write a book on it. Morris had given no references in the text to indicate whether the ideas he was discussing were his own or those of other people; he did say in the preface, however, that he was deliberately doing this, as it was a popular book, and all the works from which he had obtained his information were listed at the end of the book, but few indeed could tell which idea was taken from which book. Elaine Morgan thought she was taking up an idea that Morris himself had thought of, and then thrown away: so she wrote to ask if she could quote from him. He replied “It was not my idea at all, it is Alister Hardy’s—you should write to him.”

In passing I may say that Desmond Morris tells me he now thinks it likely that I am right. Elaine Morgan then went to one after another of my various books, two volumes of *The Open Sea, Great Waters*, and *The Living Stream*, but, of course, found nothing whatever; so she wrote to ask me if it was true that I had published on it, and I sent her the *New Scientist* article. I was at that time myself contemplating a book on the subject, but I was not then ready as I had other work on hand. I said that if she could wait a year or two I could give her much more information. However, she was bound by contracts both in America and this country to complete this book by a certain date, so I gave her my blessing to go ahead; indeed, she had every right to do so, for it was now ten years since I had made my views public. Her book, which was published under the title of *The Descent of Woman*, was a best-seller. It was partly about my hypothesis, but also a good deal about woman’s place in evolution. She gave me fullest credit for my ideas, and in addition added some very interesting ones of her own, particularly on the origin of tear glands.

I am still waiting for the fossil evidence, but at 811 must not wait too long! One of the reasons for my accepting the invitation of the editor of *Zenith* to contribute an article was that by choosing this subject I might perhaps persuade some of those in the Geology Department to organize

an undergraduate expedition to dig in Miocene deposits which would have marked a tropical shore line (or lake system) in the hope of bringing back solid fossil evidence for *Homo aquaticus*. Alas, most of such deposits are submerged below the Indian Ocean, but the experts may know of a few spots still available. If competent geologists could really put their finger upon them, I have little doubt that funds could be attracted to launch such a search for the missing link. There is still at least a 20 million year gap between the earliest fossil men and their unspecialized ancestor (*Proconsul* and the like). Let Oxford, and *Zenith* readers, fill the gap!

This would really clinch the matter, but now there has come another discovery which is almost as conclusive as the fossil evidence, or so I believe. It has been found experimentally that man has the remarkable adaptation which is found only among mammals and birds that dive under water. It is called the diving reflex and now solves the puzzle of how sponge and pearl divers can remain below so long. It only happens if a man's face is submerged; it won't occur if he wears a mask. If he dives under water and his face exposed, there is an immediate reaction cutting down the blood supply to most of the body, but leaving a good supply to both the brain and the muscles of the heart. This reaction is typical of whales, seals, penguins, and even diving ducks: I cannot believe that it could have been evolved by natural selection unless man had taken to diving under water some considerable period of his past history. The only remaining test to be made is to persuade some physiologists to do simple experiments with all the known apes. They merely have to be put in a bath of water with their faces submerged for a short time whilst an electro-cardiograph records the changes in the circulation of their blood.

If man is really unique in this I am home and dry! But in addition it would be very pleasant in my old age to have a bit of fossil *Homo aquaticus*-or a cast of it-on my mantelpiece; so perhaps the Oxford Exploration Club might think of pandering to my eccentricity.

All this, of course, is only an hypothesis and valueless till put to the test. Speculation is the fuel of scientific progress; it drives forward to discovery only if it is continually being burnt in a fire of constructive criticism. Let the critics open fire.