THE NEW MISSING LINK.

BY

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PROFESSOR RAYMOND DART, whose discovery of a "missing link" in South Africa has fallen like a bombshell on anthropological Europe, is well known to British anatomists. He is one of the many young medical graduates of Sydney University whose minds were bent towards research in anatomy by Professor J. T. Wilson, before this distinguished anatomist left Australia for Cambridge. In post-graduate days Professor Dart worked at University College, London, with Professor Elliot Smith, at the Royal College of Surgeons, and in research laboratories of the United States. He went to Johannesburg some three years ago to occupy the chair of anatomy in the University of Witwatersrand. In South Africa he found an earnest band of investigators opening up unexpected chapters in the early history of man. Old river-beds were yielding a sequence of stone implements almost as ancient as those of Europe. The remains of a fossil man had been found at Boskop, and soon after Professor Dart's arrival other human remains were found deep in the floor of a rock shelter on the southern coast of Cape Colony. These were examined by Professor Dart, and found to be of the Boskop race. Then came the discovery of Rhodesian man in the bowels of a limestone kopje in Rhodesia—a much older and more primitive type than that of Boskop. And now comes an equally remarkable discovery which is largely due to the initiative and perspicuity of Professor Dart.

In November last a lady demonstrator brought him the fossil skull of a monkey—a baboon. It came from a limestone quarry situated at Taungs, eighty miles to the north of Kimberley. There the quarrymen had worked their way 200 feet into a limestone bluff which rises 50 feet above the dry veldt of the surrounding country. The monkey's skull was blasted from the rock. Finding that his colleague, Dr. R. B. Young, professor of geology, was going to Taungs, he asked him to inquire into the source of the fossil bones in the quarry. Dr. Young arrived at the quarry in time to receive a mass of material just blasted from the base of the working face of the quarry. He gathered the fragments, and handed them to Professor Dart on his return.

In the mass of limestone Professor Dart found a cast which had formed within the brain cavity of a skull, and from the adjoining block he chiselled out the forehead and complete facial parts which went with the brain cast. The blasting had shivered and de-

stroyed most of the cranial bones. From these fragments the discoverer reconstructed the being to which he has given the name *Australopithecus africanus*. So exact and clear are his drawings and his descriptions that those who have studied his preliminary account in *Nature* (February 7th, p. 195) have all the data placed at their disposal for coming to an independent opinion. Indeed, those who have charge of much larger collections of anthropoid and human skulls and brains than

were at the disposal of Professor Dart have a somewhat unfair advantage over him. But with all these disadvantages against him his main conclusions are certain to stand.

He speaks of this new being as a "man-ape," and as standing "between living anthropoids and man." These are his expressions, but when we examine his text we find him quite alive to the fact that the animal he has brought before the scientific world is a man-like ape or anthropoid. The size and convolutionary pattern of its brain leaves one in no doubt of this matter. Many fossil fragments of higher anthropoid apes have been found on previous occasions in Europe and India, but this is the first time we have seen the complete face of one of them. In this case the animal is young; the first permanent molar teeth have cut and are coming into place; this happens in the gorilla and chimpanzee towards the end of the fourth year—two years earlier than in human children. The face in all its lineaments is that of an anthropoid; there are blended in it some

Norma facialis of *Australopithecus africanus* aligned on the Frankfurt horizontal. (Reproduced here by the courtesy of the Editors of *Nature* and of the *Illustrated London News*.)

features of the chimpanzee, others of the gorilla, and some which belong to neither. But of humanity there is no trace save in one respect—its jaws are smaller and its supraorbital ridges less developed than in a chimpanzee of a corresponding age. There is a reduction in jaw development, and such a reduction has certainly taken place in the evolution of man. Further, the milk canines are less pointed than are those of the young chimpanzee, and the interdental space in front of the upper canine is less.

In volume the brain of this new anthropoid is of the size we find in young gorillas, but its shape is different. In the brain of the gorilla the width is 82 per cent. or more of its length; the gorilla—and the same is true of the two other living anthropoids, the chimpanzee and orang—is round-brained. The gorilla is low-brained; its height is small compared with its length. *Australopithecus* is long-brained; from Professor Dart's measurements one infers that

the width was 71 per cent. of the length; the brain is compressed from side to side, and is high. Thus, amongst anthropoids, as amongst living races of mankind, we have long-heads or dolichocephals and round-heads or brachycephals. Earth pressure may compress a skull from side to side and thus alter the natural shape of the brain cavity, but one may be sure that Professor Dart was alive to this source of distortion and excluded it.

Thus we have made known to us a high anthropoid, one which is clearly related to chimpanzees and gorillas but differs from both, and in the points wherein it differs making some approach towards man. Its exact relation to the human phylum will be cleared up by its geological age. To have any claim to stand in or near the human line of descent it must be able to claim an early Miocene date at least.

All living anthropoid apes are confined to tropical jungles. The limestone bluff which served as a tomb for this new anthropoid child lies 2,000 miles from the haunts of the gorilla and chimpanzee. The first supposition one makes—and it is justified by what we know of Europe—is that the climate of South Africa has changed, and that the tropical belt had once spread over the arid deserts of Bechuanaland. Professor Dart, on the other hand, leans to the supposition that *Australopithecus* may have assumed the posture and habits which have become perfected in man, and was thus able to wander far beyond the jungle limits. We cannot be certain of posture until we find a bone of the lower limb. One cannot see any character in the skull which justifies the supposition of an erect posture.

Further evidence will make clear how this fossil skull, and numerous others belonging to monkeys of the baboon type, became embedded in the limestone cliff at Taungs. One infers that in these limestone cliffs caves had formed, and that they again, with a change in climate, became filled and obliterated by stalagmite forming on their floors and walls. Animals which had died in the cave would thus have their bones preserved as fossils. These caves may not be older than late Pliocene or earlier Pleistocene.

However this may prove to be, there can be no doubt of the high importance of Professor Dart's discovery. He has found and given an exact and full description of a new and high kind of anthropoid ape; it is not only a missing link but a very complete and important one, but it lies altogether at the anthropoid end of the chain which culminated in man. It is a discovery which places Professor Dart's name in the front rank of students of the evolution of man and anthropoid.

France.

[FROM OUR OWN CORRESPONDENT.]

Travelling.

THE French have ceased to deserve a reputation for ignoring geography. At any rate, as regards the medical world, we have many opportunities of travelling, if it were but on account of the numerous congresses. But now Dr. Loir of Havre, a great believer in thalassotherapy, is inviting us to make sea trips so that we may preach to our patients from personal experience to do the same. For those of us who can find time to take a three weeks' holiday this would be a marvellous opportunity of touring round the Mediterranean, in congenial company, and of studying some scientific subjects. If our many schools are represented on board they are sure to have quite a good discussion on the ever new subject of *ravaria*. An invitation perhaps even more tempting is extended to all medical men

—foreigners and French—by the Cie Transatlantique to visit Morocco and Algeria. Two tours have been organized: one leaving Bordeaux on March 30th for Casablanca and returning from Algiers so as to reach Marseilles on April 24th; the second leaves Marseilles on April 18th and terminates in Bordeaux on May 14th. The travelling by land will be by motor car, and all places of interest are to be visited under expert guidance. Full information can be obtained from Dr. V. Gardette (3, rue Alexandre de Humboldt, Paris 14).

A striking novelty in Morocco is the aerial ambulance service for the French expeditionary corps. Some 1,500 patients have already been evacuated through the air with no mishap. In many cases the time saved was in the ratio of a minute to two hours—namely, a twelve minutes' flight would bring a wounded man to a comfortable and safe refuge which could not have been reached under twenty-four hours by land transport. One plan is to bring the patient to the surgeon, and another is to bring the surgeon to the patient. Therefore the *aero-chir*, which is nothing less than a flying operating theatre, has been brought into existence. Professor Tuffier was the first to use such an apparatus in Morocco when rendering first aid to a French officer. The demonstration has been so complete that a medical member of Parliament, M. Chassaing, has proposed that every part of France should be equipped so as to allow the rapid evacuation by air of urgent cases. Realization sometimes works quicker than imagination.

Physician v. Physicist.

Modernization of methods was never better illustrated than at one of our medical *concours* in a provincial faculty. The subject of a written paper had been given to the candidates and they were secluded from the wide wide world, when the dean was called on the telephone and informed that one of them was communicating with the outside by means of wireless; should he call at such and such room he would certainly be edified. Incredible as it seemed, the fact proved true. Asked what he was doing with that microphone, a young man answered that he was "experimenting." He was informed that the nature of his experiments was sure to interest the magistrate and that in the meantime if he handed over his resignation from his present appointment it would certainly be accepted. So this young man will have to devote his capacities to some other branch of science than medicine. We suggest physics.

The Fight against Tuberculosis.

The President of the Republic took the chair at the Sorbonne last week at the meeting of the committee of the various associations fighting tuberculosis. In our country, where the problem of natality is appallingly urgent, the question of protection of infants is of the utmost importance. Professor Calmette showed that preservation is obtained every time that infants are separated from an infected parent. His suggestion is to provide for the child as soon as possible after birth. The country is well armed for that purpose, and statistics prove that many lives are saved. Cruel as it may seem to have one's child taken by hygienists, still it is less cruel than to have it taken by meningitis. The education of the public has now progressed enough to make this understood and accepted. In the same spirit our first mountain sanatorium for heliotherapy has just been opened at Odeillo in the Pyrenees, at an altitude of 5,000 feet. It is open to children under the protection of a certain number of institutions, priority being given to war orphans.

Bone Prothesis.

In the Necker Hospital amazing improvements are being carried out in osteoprothesis. The way bone can be replaced by plated ebonite can only be believed by those who actually see the patients and the skiagrams. Dr. Robineau has been waiting to publish his results until a sufficient number of years should have elapsed to make them certain. At the International Congress of Military Medicine (Paris, April 20th to 25th) we may expect to hear a few startling papers. This congress, with its wide opportunities of visiting various parts of France, is proving quite a success, and we hope that our British comrades will not miss this opportunity. Lest we forget! G. MONOD.