11. Four out of every ten deaths (all causes) are preventable.

12. Two billion dollars is the estimated annual economic waste due to preventable sickness and preventable deaths in the United States.

13. The birth rate is steadily declining—especially among the well-to-do classes—and at least 200,000 babies die every year from preventable disease.

14. There are 9,000,000 unmarried women and 8,000,000 unmarried men in the United States.

15. The divorce rate is increasing. In Chicago one suit is filed for every six marriage licenses issued.

16. Not less than 75 per cent. of school children need attention for physical defects or impairments prejudicial to health.

17. The large number of mental defectives and backward children in our schools presents a serious educational problem.

18. Idiocy and insanity are apparently increasing.

19. An enormous number of people are suffering from drug habits and alcoholism. The use of cigarettes has doubled within the past five years.

20. Medical men claim that victims of venereal disease are rapidly increasing.

21. Suicides continue to increase and have now reached the enormous total of over 15,000 annually. In ten years, 42,000 people have taken their lives in 100 cities.

22. America's murder rate is extraordinary. About 80 per million as against 7 to 20 for other nations. But a small number are punished for their crimes.

The adverse influence of this great body of physical and mental defectives upon the material, intellectual and moral advance of the nation, and upon the quality of present and future citizenship is self-evident.

We have made wonderful progress in fighting germ diseases, but no war is waged against organic diseases.

If the government may teach people sanitation—public hygiene—why not individual hygiene—the care of the body and its organs?

If it is a good thing to teach children to avoid illiteracy, why not how to avoid ill health?

If it pays to medically examine our soldiers periodically, why not teach the people to adopt the same health- and life-saving practise?

If we can afford to investigate the condition of swine and cattle, and of rivers and harbors for purposes of improvement, surely congress can afford to provide this National Vitality Commission to improve human efficiency and to save human life.

The primary duty of organized society is to guard the health and lives of those who compose it.

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THE REVISION OF EOANTHROPUS DAWSONI

The prehistoric archeologist sometimes uncovers strange bedfellows; no other discovery is quite so remarkable in this respect as the assemblage from the now famous gravel pit at Piltdown Common, Sussex, England. Nature has set many a trap for the scientist; but here at Piltdown she outdid herself in the concatenation of pitfalls left behind. Parts of a human skull, half of an ape-like lower jaw, a canine tooth also ape-like, flints of a pre-Chellean type, fossil animal remains, some referable to the Pliocene, others evidently Pleistocene; all at least as old as the gravel bed, some of the elements apparently derived from a still older deposit.

Has not this dazzling combination blinded the discoverers and indirectly some of their colleagues even at a distance, because of the high pitch of expectancy to which recent discoveries in the prehistoric field have, not without reason, contributed? Under the circumstances, such blindness if only temporary would be pardonable and comparatively harmless; but serious danger lurks in the possibility of its persisting long enough to become an obsession and a hindrance to future progress in this particular field.

All the cranial fragments, including the nasal bones, are human and belong evidently to the same individual. They were however so incomplete as to leave room for a difference

of opinion especially in regard to the capacity of the brain-case. Authorities are quite generally agreed that the cranium as well as the brain embodied certain primitive characters, even though the brow-ridges were smaller and the forehead less retreating than in Mousterian man (*Homo neandertalensis*).

When it came to fitting the fragmentary lower jaw to the cranium, difficulties multiplied; it was the right half of the mandible, and the articular condyle was missing. Even had it been present, there was no right glenoid fossa to receive it. However a part of the left temporal bone, including its glenoid fossa, had been preserved, but it was typically human. The lack of the parts necessary to bring the mandible and cranial base into actual contact served to cloak the lack of harmony existing between the two. This lack of harmony was likewise further obscured by the incompleteness of the symphyseal region.

The proximity of the brain-case and lower jaw in the gravel bed, their apparent agreement in size and the non-duplication of parts present; the fact that they bore the same marks of fossilization, showing "no more wear and tear than they might have received *in situ*"; the failure of previous discoveries to confirm the presence of higher apes among European Pleistocene faunas; and perhaps above all the belief that a "generalized type" had been found led inevitably to the association of cranium and mandible as parts of one individual or species. Was such a conclusion the only logical one; was it even scientifically justifiable?

In dealing with the contents of a gravel bed, it is easy to overestimate the importance of proximity. Had Piltdown been a cave deposit or a camp site, the case for proximity might have been somewhat stronger; even in these there is abundant opportunity for chance association. In any event association can never be made to take the place of articulation; and so far as Piltdown is concerned, nothing short of the actual articulation of the mandible with the skull should have sufficed to outweigh the lack of harmony existing between these parts.

The only course to pursue then is to study the parts separately, classifying each on its own merits just as if the mandible had been found at Piltdown and the brain-case in a similar deposit somewhere else in Sussex. When this is done, the problem is at once clarified and there appears a solid foundation on which to build. Viewed in this light, the lower jaw is not only no longer human, it does not belong even to a generalized type. In justice to Dr. A. Smith Woodward and his highly meritorious researches, it should be acknowledged before proceeding further that no one has given a more exact description of the Piltdown mandible than he; for he was the first to point out its resemblance to that of a chimpanzee and added: "It seems reasonable to restore the fossil on this model." Thus far he was on safe ground; but instead of stopping there, he completed the sentence with: "and make the slope of the bony chin intermediate between that of the adult ape and that of *Homo heidelbergensis*." This proved to be the parting of the ways; for after a further description of both cranium and mandible, we find the following:

> The specimen therefore represents an annectant type, and the question arises as to whether it shall be referred to a new species of *Homo* itself, or whether it shall be considered as indicating a hitherto unknown genus. The brain-case alone, though specifically distinguished from all known human crania of equally low brain-capacity, by the characters of its supraorbital border, and the upward extension of its temporal muscles, could scarcely be removed from the genus *Homo;* the bone of the mandible so far as preserved, however, is so completely distinct from that of *Homo* in the shape of the symphysis and the parallelism of the molar-premolar series on the two sides, that the facial parts of the skull almost certainly differed in fundamental characters from those of any typically human skull. I therefore propose that the Piltdown specimen be regarded as the type of a new genus of the family Hominidæ, to be named *Eoanthropus* and defined by its ape-like mandibular symphysis, parallel molar-premolar series, and narrow lower molars which do not decrease in size backwards; to which diagnostic characters may probably be added the steep frontal eminence and slight development of brow-ridges.

The species of which the skull and mandible have now been described in detail may be named *Eoanthropus dawsoni,* in honor of its discoverer.

From the start there were not lacking those who hesitated to accept the cranium and mandible as belonging to the same individual. This was the stand taken by Sir Ray Lankester on the occasion of the first report of the discovery before the Geological Society of London in December, 1912. On the same occasion Professor Waterston was even more emphatic, saying it was very difficult to believe that the two specimens could have come from the same individual, since the mandible resembled that of a chimpanzee, while the skull was human in all its characters. In a later paper on the Piltdown mandible,[1] he concludes that referring the mandible and cranium to the same individual would be equivalent to articulating a chimpanzee foot with the bones of a human thigh and leg.

Objections soon came also from France and Italy. Basing his opinion on the cranial characters, Dr. R. Anthony[2] thought the specific name should have been *Homo dawsoni* instead of *Eoanthropus dawsoni.* About the same time a similar conclusion was reached by Dr. V. Giuffrida-Ruggeri. To Professor Marcellin Boule,[3] the Piltdown mandible is exactly like that of a chimpanzee; so that if this mandible had been found alone in the gravels of Piltdown associated with remains of Pliocene animals, it would certainly have been called *Troglodytes dawsoni.* Without rejecting Smith Woodward's interpretation, which Boule considers to be within the realm of the possible, even of the probable, it would nevertheless seem to him prudent to leave the matter still open. He objects to the choice of the name *Eoanthropus,* and finally in his judgment Woodward's restoration does not ring true (*elle sonne faux*).

It was this false note that impressed me most of all on seeing the restoration for the first time. The inherent difficulty in making Dr. Woodward's restoration ring true rests on the attempt to adjust parts that were never intended for each other. This would seem to have been demonstrated to an absolute certainty by Dr. Gerrit S. Miller[4] of the United States National Museum. He has compared the cast of the Piltdown mandible with casts of chimpanzee mandibles mutilated in the same manner, and finds not only similarity, but absolute identity. During the month of December, 1915, the writer was in Washington and examined the material on which Miller bases his conclusions, conclusions from which it would seem impossible for any one to escape, who approaches the question with an open mind. In an article on "Recent Progress in Vertebrate Paleontology," which appeared in Science[5] after the present article was begun, one of the joint authors, Dr. W. D. Matthew, says that Dr. Miller's "argument is convincing and irrefutable." The ape-like canine tooth found at Piltdown by Father Teilhard and referred by Woodward to the right side of the lower jaw, is considered to be the left upper canine by Miller, who thus agrees with the views previously expressed by Mr. A. E. Anderson and Dr. W. K. Gregory.

Regarding the Piltdown specimens then, we have at last reached a position that is tenable. The cranium is human as was recognized by all from the beginning. On the other hand, the mandible and the canine tooth are those of a fossil chimpanzee. This means that in place of *Eoanthropus dawsoni* we have two individuals belonging to different genera, namely: (1) *Homo dawsoni,* and (2) *Troglodytes dawsoni* as suggested by Boule, or *Pan vetus,* sp. nov., if we adopt Miller's nomenclature.

Such a revision does not by any means minimize the importance of the Piltdown discovery. On the other hand it contributes to our knowledge of the fossil fauna of the period in question by the addition of the chimpanzee to the list. As for the Man of Piltdown, he still exists and is quite as ancient as he was before the revision, which is saying a good deal; even if he is robbed of a muzzle that ill became him.

[1] *Nature,* November 13, 1913.

[2] *Rev. anthropologique,* September, 1913.

[3] *L'anthropologie,* Jan.–Avril, 1915.

[4] "The Jaw of the Piltdown Man," Smithsonian Misc. Colls., Vol. 65, No. 12, November, 1915.

[5] January 21, 1916, p. 107.

The only thing missing is *Eoanthropus,* and since he was never there anyway, the loss is small; besides, we can well afford to continue our search and live in the hope that he may be caught next time. Meanwhile the restorations by Woodward, McGregor and others may still serve a more or less useful purpose as substistutes for *Eoanthropus* until he shall have been found.

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PROVISION FOR THE STUDY OF MONKEYS AND APES

BIOLOGISTS are generally agreed that the study of the primates, and especially of the monkeys and anthropoid apes, is of extreme importance. It is evident that this work, nevertheless, has been neglected. We have but fragmentary and unsatisfactory knowledge of the structure and development (gross anatomy, histology, embryology) of most of the primates; we know less, definitely, concerning their physiological processes, diseases and pathological anatomy; still less, of the phenomena of heredity and of their life history; and next to nothing, with certainty, concerning their instincts, habits, other individual modes of behavior, mental life, and social relations.

The reasons for this ignorance where knowledge might reasonably be expected are not difficult to discover. Most investigators are either impelled or compelled by circumstances to work on easily available and readily manageable organisms. Many of the primates fail to meet these requirements, for they are relatively difficult and expensive to obtain by importation or breeding, and to keep in normal condition. It is clear from an examination of the literature on these organisms and a survey of the present biological situation that the neglect by scientists of systematic study of all of the primates excepting man is due, not to lack of appreciation of their scientific value, but instead, to technical difficulties and the costliness of research.

For hundreds of years men have been interested in the various types of lower primates and have more or less casually and incidentally studied aspects of their lives. But thus far there has been no definite plan or program for the systematic and continuous study of these animals. In view of the obvious and urgent need of such a program for research which is admittedly of practical as well as theoretical importance I venture to present to my scientific colleagues the following briefly sketched plan.

There should be provided in a suitable locality a station or research institute which should offer adequate facilities (1) for the maintenance of various types of primates in normal and healthy condition; (2) for the successful breeding and rearing of the animals to many generations; (3) for systematic and continuous observation under reasonably natural conditions; (4) for experimental investigations from every significant biological point of view; (5) for profitable cooperation with existing biological institutes or departments of research throughout this country and the world.

The institute should be located in a region whose climate is in high degree favorable to the life of a variety of lower primates and to man. It is eminently desirable to avoid, in the interests of scientific achievement, an enervating tropical climate and unnecessary isolation from civilization and from centers of scientific activity. Since it is probably impossible to find a location which would be ideal for both subjects and observers, it will doubtless prove necessary to sacrifice in a measure the interests of each. During the past three or four years, I have accumulated information bearing on the several problems involved in the locating of an anthropoid station and have had opportunity to prospect for such an institute in widely separated regions. Chief among the regions considered are Borneo, Hawaii, southern California, Florida, the Panama Canal Zone, Jamaica and the Canary Islands. Of all of these, southern California seems at present most promising, and although it is not perfectly certain that any or all of the anthropoid apes can be successfully bred there (various other primates