zations represented on the board. The present members of the committee are the president and vice-president of the board, Dr. J. McKeen Cattell and Dr. J. C. Merriam. A member from the journalistic group is yet to be selected.

The headquarters of Science Service have been provisionally established in the building of the National Research Council, at 1701 Massachusetts Avenue, Washington, D. C.

As editor the board of trustees has selected Edwin E. Slosson, Ph.D., who for twelve years was professor of chemistry in the University of Wyoming and for seventeen years literary editor of *The Independent,* New York. He has been associate in the Columbia School of Journalism since its foundation and is the author of "Creative Chemistry," "Easy Lessons in Einstein," "Great American Universities," "Major Prophets of To-day," lives of Rumford and Gibbs and other scientific and literary publications.

As manager of the new enterprise the board has selected Howard Wheeler, formerly editor of the San Francisco *Daily News,* Pacific coast manager of the Newspaper Enterprise Association, managing editor of *Harpers Weekly,* and for five years editor of *Everybody's Magazine,* war correspondent and author of "Are We Ready?"

The editor of Science Service desires to receive advance information of important researches approaching the point of publicity in order to arrange for their proper presentation in the press. He also wishes to secure correspondents in every university and center of research who have the time, disposition and ability to write for non-technical journals. He particularly wants to get in touch with young men and women in the various sciences who have literary inclinations and would be willing to submit to a rigorous course of training with a view to making the writing of popular science a part of their life work.

The manager wants to learn from newspapers and periodicals what sort of scientific news they need. If editors will notify Science Service by mail or telegraph whenever they want an article on any scientific subject, an effort will be made to find the best authority to write it. EDWIN E. SLOSSON

THE DISTRIBUTION OF HOOKWORMS IN THE ZOOLOGICAL REGIONS

INCIDENTAL to the pursuit of some public-health problems in the Orient I observe what seems to me to be a peculiar zoological and geographical distribution of two species of hookworms which parasitize man, *Ancylostoma duodenale* and *Necator americanus* and I feel confident that a study of the distribution of these obligate parasites of man will throw some light on problems dealing with the migrations of races of mankind in the past as well as other problems in ethnology.

Ancylostoma duodenale and *Necator americanus* parasitize man with equal facility. It is as easy for a white man, Chinese, Polynesian, East Indian, Malay or Negro to become infected with *A. duodenale* as with *N. americanus* and they may become infected with either or both species of worm, but it was rather remarkable to find that just as the races of man were primarily distributed in Urasia, Africa and Oceania so there seems to have been a primary and distinctive distribution of *A. duodenale* and *N. americanus* for I found that Japanese, East Indians and Chinese from north of say twenty-three degrees north latitude, that is men of the Holarctic region, harbored a very marked predominance of *A. duodenale.* On the other hand southern East Indians, *i.e.,* Tamils and Malabaris say from south of twenty degrees north latitude as well as Malays from Sumatra, Borneo, the Malay Peninsula and Java, that is to say, men of the Oriental region, harbored a marked predominance of or were exclusively parasitized by *N. americanus.*

In studying the hookworm content of an uncontaminated group of Fijians, a mixed Polynesian and Melanesian stock, I found *A. duodenale* to be entirely absent. *N. americanus* and a few *A. ceylanicum,* picked up from dogs, represented the worms harbored.

In South Africa among Kaffirs from south of twenty-two degrees south latitude and among some tropical natives, that is to say

men from the Ethiopian region, *Necator* was the only hookworm encountered. The search was not an exhaustive one. Leiper and others, however, have recorded only *Necator* from this region.

I have not worked in Europe or northern Africa but Looss, Boycott and others report the exclusive presence of *A. duodenale* in England, western Europe, Italy and Egypt, that is to say in the European moiety of the Holarctic region.

The introduction of the negro, East Indian and Mediterranean peoples into America has obscured the picture here and research among isolated and uncontaminated Indian tribes has yet to be undertaken. This research will no doubt yield some interesting data, helpful possibly in tracing the origin of the Amerind populations; it may be possible to trace a relationship for them with Mongoloids from Holarctic or from Oriental regions.

While there is a sharply marked out regional distribution of the worms in certain areas, in others time has brought about some overlapping of the two species.

The absence of *Necator* from Europe indicates pretty positively that European soil has not been contaminated by a Negroid race from the Ethiopian region, that is Africa south of the Sahara desert. The absence of *A. duodenale* from secluded groups of mountain people in the Oriental and in Ethiopian regions is explained in a similar way. In mid-Java and in a few coast and river towns in Fiji, East Indians have brought in large numbers of *A. duodenale* within historic times.

The movements of negroes, Oriental and Mediterranean peoples are modifying the primitive worm-species-formula of non-migratory people, hence interpretations must be made from carefully selected surveys only.

It is held by some that man and his obligate parasites living in symbiosis have come along through the ages together, that the relationship has not been recently or casually acquired. If this be true we should expect to find man parasitized always by the two obligate forms and not to find man of the Holarctic regions parasitized exclusively or almost exclusively by *A. duodenale,* while man of the Oriental and Ethiopian regions parasitized exclusively or almost exclusively by *Necator americanus.* This finding in any case suggests the possibility of the distribution of the two species of worms in distinctly different zoologic as well as geographic regions being due to there having been two primitive races of man, each one originally parasitized by a particular species of worm. Certain it is that *N. americanus* is found more exclusively among black- and brown-skinned races, while *A. duodenale* is found exclusively or greatly predominates at the present time among Caucasian and Mongoloid stocks.

It may be that a Eurasiatic race of man, possibly the *Pithecanthropus* of Trinil, Java, became split off and furnished the stock from which man of Oriental and Ethiopian regions sprung. *Proliopithecus* emerging from Holarctic Africa may have been not only the parent form of man, gibbon, chimpanzee, gorilla and the orang-outang, but he may have harbored the parent form from which have arisen the different hookworm species found in the various species of anthropoids of today. Possibly the ancestral tree of the primates can be revised after a study of the host relationships of their respective obligate nematode parasites. At any rate we can say that it seems likely from the present distribution of *A. duodenale* and *N. americanus* as determined in surveys recently made of selected groups that there were originally races of man parasitized exclusively by *A. duodenale* and inhabiting the Holarctic region, that is Europe, Asia, north of the Oriental region and northern Africa; and that there were other races of man parasitized exclusively by *N. americanus* and inhabiting the Oriental region, that is the southern peninsulas of Asia and Indonesia or the Malay Archipelago; and also the Ethiopian region, that is, Africa south of the Sahara Desert.

The subject is an enticing one to pursue but further deductions should probably not be hazarded at this time by one who is merely a peregrinating parasitologist.

Samuel T. Darling
International Health Board