

### Letters to the Editor.

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#### River Terraces of the Euphrates.

IN NATURE (vol. III, p. 332, 1923) attention was directed to the remarkable uniformity in height of the successive terraces bordering the rivers which open into the Mediterranean Sea and the Atlantic Ocean. We now learn from Dr. E. Passemard (C.R., t. 183, p. 365, 1926) that this uniformity extends beyond these regions into the valley of the Euphrates, which opens through the Persian Gulf into the Indian Ocean.

Five well-marked terraces are well displayed one above the other on the right bank of the river along the great curve which it makes in passing from Rakka to Deir-el-Zor. Their heights above the river, as measured by M. Darrous, Topographer to the "Mission hydrographique Héraud," are given in metres in column 1 below :

	1.	2.
5th Terrace	77·13	93·95
4th "	56·14	55·57
3rd "	30·52	28·30
2nd "	15·36	15·16
1st "	3·60	...

A comparison of these with those of the terraces of the Isser, Algeria, measured by General Lamothe (col. 2), reveals a remarkable correspondence between the 2nd, 3rd, and 4th terraces of the two rivers : but this agreement does not extend to the 5th terrace. The 1st terrace was not observed on the Isser, but it exists at about the same height elsewhere in the Atlantic region.

The interest of these observations is increased by the discovery in the 3rd terrace of an implement which is assigned by Dr. Passemard to the upper Chellean industry.

University Museum,  
Oxford.

W. J. SOLLAS.

#### The Transmission of Cutaneous Leishmaniasis to Man from Artificially Infected *Phlebotomus papatasi*.

THREE examples of the transmission of cutaneous Leishmaniasis to man from naturally infected sandflies, *P. papatasi* ♀♀, have been recorded by us (*Ann. Trop. Med. and Parasitol.*, vol. 20, No. 2). It was also shown that the causative organism in each of the three lesions was biologically and morphologically identical with *Leishmania tropica*. There could therefore remain no doubt as to *P. papatasi* being a transmitter of *Leishmania tropica*.

Nevertheless, inoculation experiments performed in 1925 on seven volunteers, with flagellates from sandflies artificially infected by feeding on oriental sores, all proved negative. In these experiments flagellates were obtained from sandflies 2, 4, 5, 6, and 7 days after the infecting feed. Since *P. papatasi* is a proved carrier of *L. tropica*, it was possible to account for these negative results only on the theory that *L. tropica* undergoes a complete biological cycle of development in the sandfly, and until the cycle is completed all the flagellates (and *Leishmania* forms) in the sandfly are non-infective.

In order to determine at what stage *L. tropica* in the sandfly becomes infective, a further series of experiments was performed with flagellates from artificially infected, laboratory-bred sandflies 8, 9, 10, 11, 12, 13, 14, 15, and 21 days after the infecting feed. All the sandflies were kept at laboratory temperature, 19°-23° C. The infecting feeds were made on a lesion which was the result of an artificial infection with flagellates from a natural infected sandfly. Up to the present two experiments have given positive results.

(1) *P. papatasi* ♀ hatched in laboratory, Sept. 8, 1926; fed on experimental lesion same date; died on Sept. 16, and dissected soon after death. (No further feed was allowed after the infecting feed.) Numerous flagellates were found in the pharynx, oesophagus, and mid-gut of the sandfly, but none in the hind-gut. Two inoculations were made into the left forearm of a volunteer shortly after the dissection.

Oct. 14, 1926. A papule noted on the site of one of the inoculated points was found to contain numerous Leishman-Donovan bodies.

(2) *P. papatasi* ♀ hatched in laboratory, Sept. 7, 1926; fed on experimental lesion, Sept. 9; died Sept. 17, and dissected shortly after death. (No further feed was allowed after the infecting feed.) Numerous flagellates were found in the whole alimentary tract from pharynx to rectum. Two inoculations were made into the left forearm of a volunteer shortly after the dissection.

Oct. 14, 1926. A papule on the site of one of the inoculated points was found to contain Leishman-Donovan bodies.

Thus a strain of *L. tropica* has been observed between June 26, 1925, and Oct. 14, 1926, through four successive generations of hosts.

- (1) A sandfly (naturally infected).
- (2) A human being experimentally infected from (1).
- (3) Laboratory-bred sandflies infected from (2).
- (4) Human beings infected from (3).

The proof that *Phlebotomus papatasi* is a transmitter of cutaneous Leishmaniasis is therefore complete.

S. ADLER.

O. THEODOR.

Microbiological Institute,  
Hebrew University,  
Jerusalem, October 15.

#### Science and Psychical Research.

IN reply to Dr. Tillyard's letter in NATURE of October 23, I cannot see that 'catalytic agent' is in any way a better simile for a medium than is the word 'instrument,' for catalysts, equally with instruments, are not possessed of any form of consciousness or of motives. Moreover, how can we be sure, as Dr. Tillyard states, that a medium is not actively a participant in the experiment? Trances can be simulated, and anyway, what is to prevent the subconscious mind being affected by motives, just as may be the case in the fully conscious mind?

The occasional failure of experiments in chemistry classes, as also, let me add, in the case of physics demonstrations, have no analogy to the uncertainty that seems to exist in all psychic affairs. As Dr. Tillyard must well know, no new fact in chemical or physical science is ever finally accepted until the experiments that establish it have been repeated by numerous observers, and further, until observers are satisfied that the experiments can be repeated with certainty at will, and give identical results under the same conditions every time.

Where do we get such exactness in psychical re-