ble of transmitting the infection are *Chrysops discalis, Stomoxys calcitrans, Ceratophylis acutus, Cimex lectularius, Polyplax serratus* and *Hæmodipsus ventricosus.* The first four of these insects bite both rodents and man. Infection probably occurs most commonly through the bite of *Chrysops discalis.* The bacillus causing the disease is a very minute organism and can best be cultivated upon egg-yolk media, but no growth is obtained on ordinary nutrient agar. The organism produces a plague-like disease in rodents, and in fatal guinea pig infections the gross lesions can not be distinguished from those produced by *B. pestis.* The pathological histology of the lesions caused by *B. tularense,* as shown by Councilman and the writer, are, however, quite different. In the lymph-nodes, liver and spleen, there are miliary foci formed by accumulation of mononuclear cells followed by necrosis and infiltration with polymorphonuclear leucocytes. There is a general infection of the endothelium of the blood vessels and the organism may be found in these cells in any part of the body. In addition the organisms pass from the endothelium into the cells of the liver, which they gradually destroy and replace, forming large globular masses of bacilli. The infection of the endothelial cells presents a somewhat similar picture to that seen in typhus fever but not in any other disease where these cells are distended with *rickettsia.*

It is hoped that this article will in some degree serve to emphasize the important position which the subjects of medical zoology, entomology and parasitology have recently taken in connection with general progress in medical science, and the fact that they are subjects which have important practical application in preventive medicine; that they constitute adjuncts to hygiene which have been most successfully prosecuted in tropical countries but which can not be wisely neglected in any country; that by the more thorough and fundamental training of medical men in these branches still greater progress in the elucidation of the many and perplexing problems connected with the etiology, prevention and control of the infectious diseases more common in temperate climates may be expected. Finally, it is hoped that it will not only indicate the most important recent progress in the fields of science referred to, but that it will also serve to some extent to stimulate and guide research in a few of those channels in which further knowledge is urgently needed.

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EXTRACTS FROM ESSAYS OF LEONARDO DA VINCI

LOOKING over the translation of "Leonardo da Vinci's Notebooks" by Edward McCurdy (Scribners), I was reminded of the high praise awarded the great artist-engineer in Lyell's "Principles of Geology." Priests and scholars in da Vinci's day were wrangling over the origin of fossils. Were they forms or models produced in the fatty matter (*materia pinguis*) of the earth by the revolution of the stars? Were they relics of Noah's flood; were they, as Voltaire suggested, cockle-shells; were they dropped from pilgrims' hats during the crusade?

In these notebooks, from which I give here a brief extract, Vinci makes the whole matter perfectly clear, for he was a close observer and a skilful engineer, qualities rare in that age of fine painting and loose thinking. If men had listened, it would not have taken 150 years to prove that fossils had once been alive, and another 150 to prove that they were not all buried simultaneously in the great flood.

DAVID STARR JORDAN
STANFORD UNIVERSITY,
APRIL 6, 1923

Defense of Fossil Shells as Once Living Organisms

As for those who say that the shells are found over a wide area and produced at a distance from the sea by the nature of the locality and the disposition of the heavens which moves and influences the place to such a creation of animal life,—to them it may be answered that, granted such an influence over these animals, they could not happen all in one line, save in the case of those of the same species and age; and not one old and another young, one with an outer covering and another without, one broken and another whole, nor

one filled with sea sand, and the fragments great and small of others inside the whole shells which stand gaping open; nor the claws of crabs without the rest of their bodies; nor with the shells of other species fastened on to them, like animals on the outside where it has eaten its way like a worm in wood; nor would there be found among them bones and teeth of fish which some call arrows, other serpents' tongues; nor would so many parts of different animals be found joined together, unless they had been thrown up there upon the borders of the sea.

And the Flood could not have carried them there, because things which are heavier than water do not float high in the water, and the aforesaid things could not be at such heights unless they had been carried there floating on the waves, and that is impossible on account of their weight.

Where the valleys have never been covered by the salt waters of the sea, there the shells are never found.

Such things are far more ancient than letters, it is not to be wondered at if in our days there exists no record of how the aforesaid seas extended over so many countries; and if moreover such record ever existed, the wars, the conflagrations, the deluges of waters, the changes in speech and habits have destroyed every vestige of the past. But sufficient for us is the testimony of things produced in the salt waters and now found again in the high mountains far from the seas.

Apostrophe to a Huge Fossil Fish, Sword Fish or Tunny

O powerful and once living instrument of constructive nature, thy strength not availing thee, thou must needs abandon thy tranquil life to obey the law which God and time ordained for all procreative nature! To thee availed not the branching, sturdy, dorsal fins wherewith pursuing thy prey thou wert wont to plough thy way, tempestuously tearing open the briny waves with thy breast.

O how many times the frightened shoals of dolphins and big tunny fish were seen to flee before thy insensate fury; and thou, lashing with swift, branching fins and forked tail, didst create in the sea mist and sudden tempest, with loud uproar and foundering of ships; with mighty wave thou didst heap up the open shores with the frightened and terrified fishes, which thus escaping from thee were left high and dry when the sea abandoned them, and became the plenteous and abundant spoil of the neighboring peoples.

* * * * *

O time, swift despoiler of created things! How many kings, how many people hast thou brought low! How many changes of state and circumstances have followed since the wondrous form of this fish died here in this hollow, winding recess? Now destroyed by time patiently thou liest within this narrow space, and with thy bones despoiled and bare are become an armour and support to the mountain which lies above thee.

O how many times hast thou been seen amid the waves of the mighty, swelling ocean, towering like a mountain, conquering and overcoming them! And with black finned back ploughing through the salt waves with proud and stately bearing!

SCIENTIFIC EVENTS

OXFORD MEMORIAL TO SIR WILLIAM OSLER

AT the final meeting of the subscribers to the Oxford Osler Memorial Fund held at the University Museum, Oxford, Sir Herbert Warren, president of Magdalen College, chairman of the executive committee, explained in a brief introduction that the Oxford Memorial was only one of several, the United States of America and Canada, in which Sir William had spent a larger part of his life, having decided to establish memorials of their own.

The secretary, Dr. J. A. Gunn, stated that the fund now amounted to just short of £2,000. The following proposals were submitted on behalf of the executive committee:

(1) The purchase of a bronze plaque of Sir William Osler, measuring 32 by 22 inches, a copy of that by Vernon of Paris, made for the Medical Faculty of Maryland, to be hung in the university museum; (2) the establishment of a fund for the foundation of an Osler Memorial Medal in bronze, to be awarded every five years to a graduate of the University of Oxford who has made some distinguished contribution to medical science, learn-