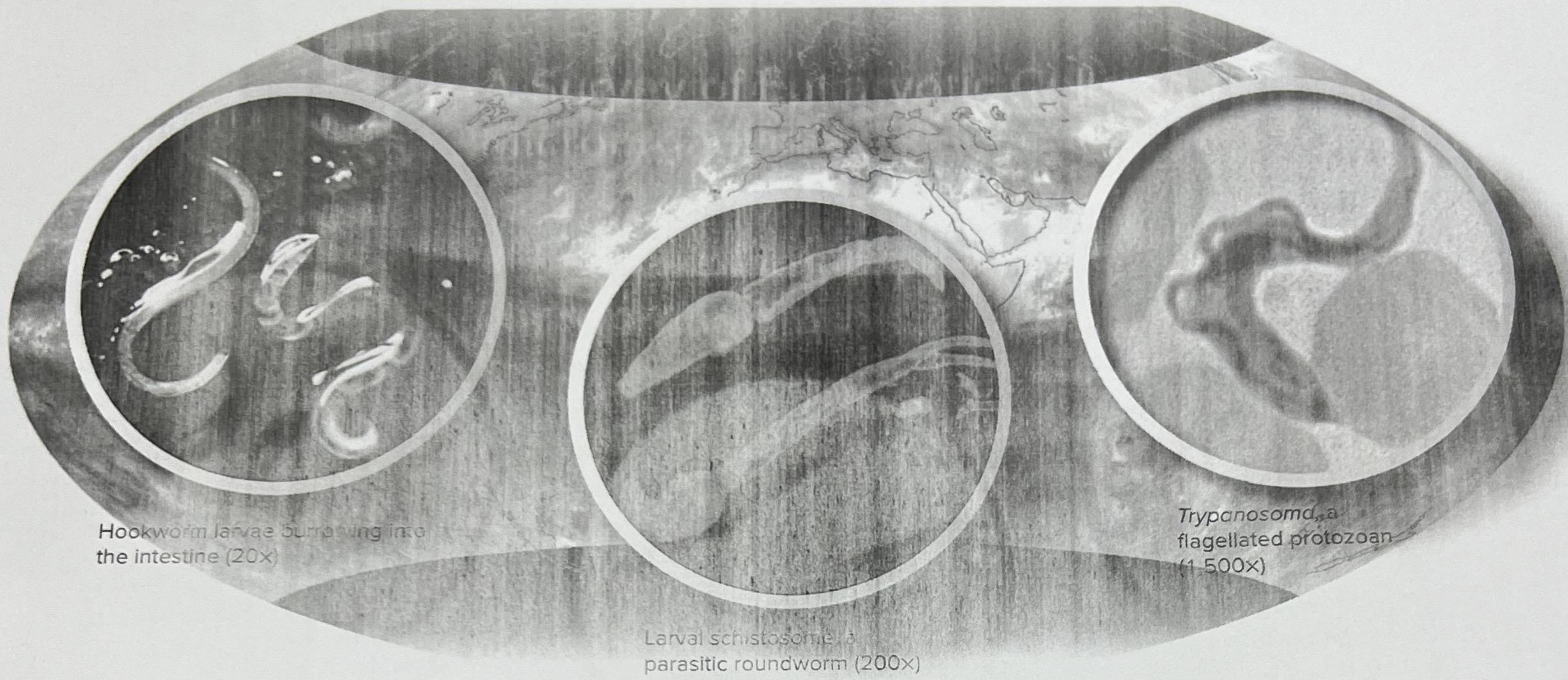


A Survey of Eukaryotic Cells and Microorganisms



Hookworm larvae burrowing into the intestine (20x)

Larval schistosome, a parasitic roundworm (200x)

Trypanosoma, a flagellated protozoan (1,500x)

Examples of microorganisms that cause neglected diseases, distributed across the earth's tropical and subtropical zones (bands of blue) (top): Source: NASA Earth Observations; (bottom: left): Source: CDC; (bottom: middle): Source: Dr. Sulzer/CDC; (bottom: right): Source: Dr. Myron G. Schultz/CDC



CASE STUDY Part 1 Neglected Tropical Diseases

Some of the worst suffering in the world originates from a group of ancient infectious diseases that exist primarily in the **tropical** and **subtropical** regions of Africa, India, Latin America, and Asia. Nearly 1.4 billion people worldwide, sometimes referred to as the “**bottom billion**,” experience disability or death as a result of 17 common diseases.

These **neglected tropical diseases**, or **NTDs**, have received less attention than highly publicized diseases such as **AIDS**, **malaria**, and **tuberculosis**, and they have been largely ignored by the medical establishment in many countries. Unfortunately, they also tend to occur in the poorest rural areas, where access to treatment is often severely limited. “Almost everyone in the bottom billion has at least one of these diseases,” said Dr. Peter Hotez, a **parasitologist** and medical doctor at George Washington University. Taken together, NTDs rank second only to HIV/AIDS in their medical, social, and economic impact.

Eleven of the 17 neglected disease pathogens are **eukaryotic parasites**, either parasitic **helminth worms** or **protozoans**. The leading parasitic worm infections are **ascariasis**,* **trichiuriasis**, **hookworm**,

and **schistosomiasis**, and the leading protozoan infections are **Chagas disease**, **African trypanosomiasis**, and **leishmaniasis**. The **chronic, progressive** actions of these infectious agents can cause

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Hans Forssberg of the Nobel Committee

debility and disfigurement. Consider Chagas disease, caused by the protozoan *Trypanosoma cruzi*, which over time lodges in the heart and other organs, destroys health, and shortens life. Some forms of leishmaniasis affect the skin and give rise to growths that deform the face and other body parts. The growth of hookworms causes blood loss, saps strength, and impairs development. Some parasites cause blindness and others disfigure the limbs. In addition to medical effects, many vic-

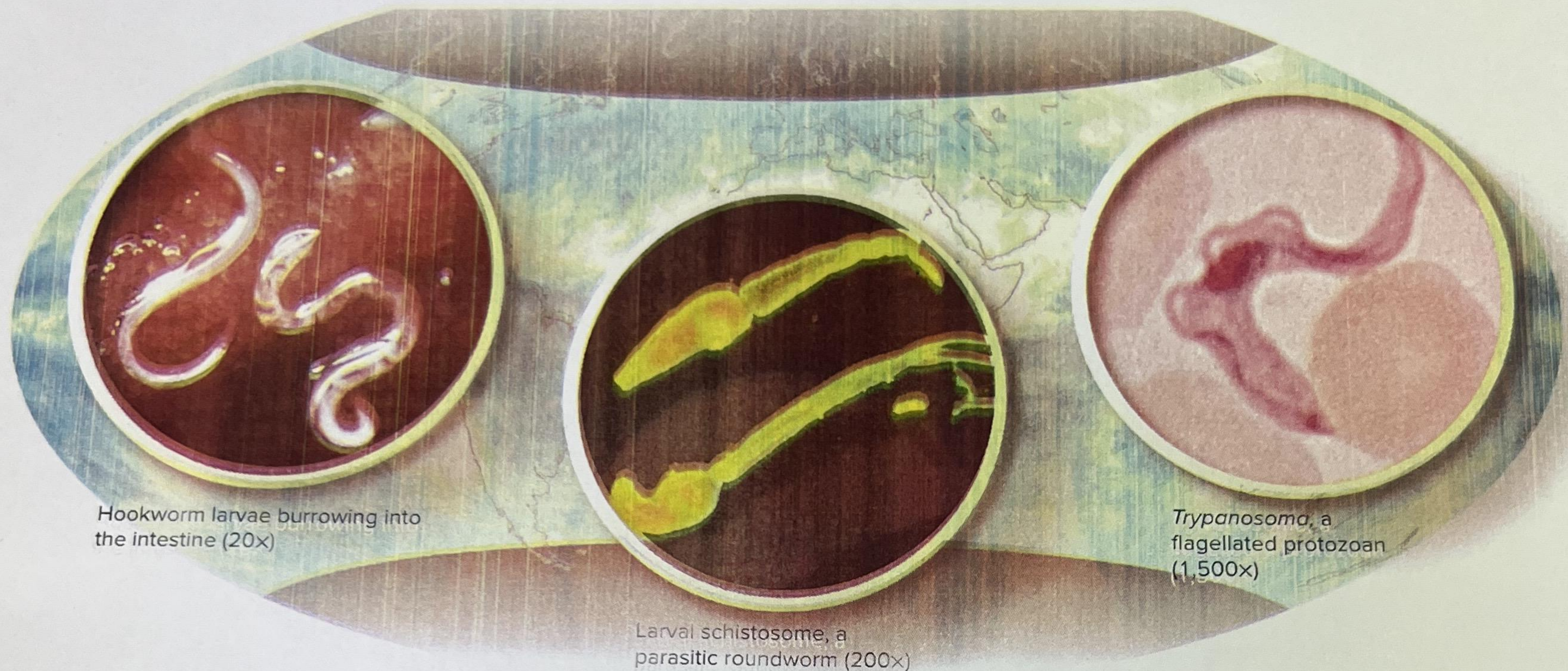
tims become unable to go to school or work and are harshly ostracized by their communities.

- What subjects are studied by the science of parasitology?
- What can you conclude about the total number of NTD cases, given that everyone in the bottom billion has at least one infection?

To continue the Case Study, go to Case Study Part 2 at the end of the chapter.

* Some diseases are named by adding the suffix *-iasis* to the name of the organism that causes it.

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