that the earth tides keep in step with the fluid tides of the ocean.

A few more remarks of this kind could be added. But they are in general of minor importance and can be made of every book in which such a wealth of new material has been digested. In fact, the book is exceedingly accurate. The definitions are very carefully chosen, and even where others have usually gone wrong, the book gives correct statements. Typographical errors are also very rare.

Astronomical instruments are briefly treated. Sextant, theodolite, zenith telescope, heliometer are not even mentioned. Apparently the author chooses to emphasize results more than methods of research.

The book is well up-to-date. Pluto, discovered so recently at the Lowell Observatory, is incorporated as the ninth principal planet. Justice is done to the importance of astrophysical research by devoting an admirable 40-page chapter to the constitution of the stars. In this chapter we find a very clear picture of what very recent developments have contributed to our knowledge of the make-up of stars. The following two chapters on the galactic system and exterior galaxies are also up to the minute.

An unusual subject in a book on astronomy is the earth's atmosphere, to which some considerable attention is paid, in particular to illustrate analogies with the sun and the planets.

The author has all sorts of illustrations at his disposal to make facts of exact nature clearly understood: "Everywhere in its interior the intensely hot star is kept inflated like a tire but with far less immediate danger for a blow-out or collapse" (p. 415) is but one example. He uses such parallels with all the freedom that has become common in scientific papers nowadays. But one never gets the impression that he has sacrificed any of the dignity of the science.

References to later sections are frequent throughout the book. For this reason it can not be easy reading for the general public whose knowledge of astronomy is meager. It does not, however, diminish its merits as a text-book for class use, or as a reference book. These merits are considerable. The book easily deserves a prominent place among the several good text-books that have recently appeared.

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REPORTS

THE LÜBECK DISASTER[1]

OF the children inoculated in Lübeck with the BCG vaccine, more than fifty have died. Unfortunately, according to medical opinion, further deaths are to be expected, as the disease covers a period of from one to two months and the vaccinations were carried out at different times. The federal ministry of the interior has just published a statement based on the results of the inquiry as far as it has progressed. The statement throws a new light on the events in Lübeck and shows with what energy all persons in authority are working to clear up the matter. The statement of the federal ministry of the interior is expressed in precise terms and reads thus:

As was unfortunately to be expected, the terrible disaster that overtook the population of Lübeck in connection with the treatment to establish in children immunity to tuberculosis has not proved to be a catastrophe of only short duration but a calamity involving a series of fatalities and protracted illnesses the end of which is not yet definitely in sight. It is easily intelligible that the excitement over the sad event does not die down at once and that at home and abroad the demand for a more complete explanation of the disaster continues to persist. From the tone of the statements made by the federal minister of the interior, May 21, at the session of the head committee, and, June 16, at the plenary session of the reichstag, it was plainly evident that the investigations of the matter had been begun promptly and that they would be prosecuted without sparing any person or the prestige of any scientific method. Since, however, in some quarters suspicions to the contrary found expression, attention must be called to the fact that the scientific side of this affair involves some of the most difficult problems of bacteriology. The Federal Health Bureau was entrusted by the Federal Ministry of the Interior with the prosecution of the scientific investigations. The definitive outcome of the inquiry can not be announced before three to four weeks.

So far as it is possible to form an opinion from the investigations to date carried on by Professor Dr. Ludwig Lange, who was entrusted with this end of the research, it may be stated that the Calmette culture supplied by the Pasteur Institute in Paris was above reproach, but that it became contaminated during the process of recultivation in Lübeck. It is not open to question but that the Federal Health Bureau is using all available scientific means in the investigations that are being carried on to throw light on the complicated problem—investigations that are planned on a wide scale and will require the use of 600 or more experi-

[1] Berlin correspondent of the *Journal* of the American Medical Association.

mental animals. The frequently expressed wish that the course of the investigation might be expedited can not, however, be complied with, since biologic processes are involved in which any such attempts to influence matters are out of the question.

Separate from the question devolving on the Federal Health Bureau whether or not the Calmette prophylactic material as such was capable of producing the severe tuberculous infections in the infants instead of protecting them against the disease must be considered the question whether or not everything was done in Lübeck to carry out in a manner above reproach the Calmette prophylactic treatment, after it was once decided to employ it. The investigation of the manner in which the vaccine was employed is primarily the duty of the state of Lübeck. In the course of the investigations, a series of incriminatory charges developed, as was foreshadowed in the report of the referee sent to Lübeck by the Federal Ministry of the Interior, May 22. In this connection, the following points merit consideration.

1. After the federal ministry of the interior, in 1927, in the matter of protective treatment against tuberculosis by means of living bacilli, in agreement with the conclusions reached by the federal health council, had recommended a conservative policy, it would have been proper if the Lübeck centers concerned, before instituting the vaccine treatment, had inquired whether or not the federal ministry of the interior, in spite of many favorable reports from foreign countries, still preserved its waiting attitude.

2. After the original culture secured from the Pasteur Institute had been recultivated for nearly nine months in the Lübeck laboratory on various cultivating mediums, it would have been wiser, before the first application of the protective material to infants, to test its potency by animal experimentation. That was not done.

3. The surveillance of the children who were inoculated with the vaccine was not adequate.

4. The destruction by Professor Deycke, April 26 (that is, after the harmfulness of the protective material had become known), of the supply of vaccine left in his hands must be regarded as of questionable indication, irrespective of the motives that induced the act. Professor Deycke's action did not, however, militate against the clearing up of the affair, since the Federal Health Bureau was able to secure possession of entirely sufficient remnants of the protective material employed. The Federal Health Bureau was able to obtain all other research material needed.

5. It can not be justified that, after the forenoon of April 26, when the harmfulness of the protective vaccine employed had been proved by the necropsy on one of the infants who had died, several doses of the vaccine were allowed to remain in the hands of midwives. Fortunately, this remaining vaccine was not administered to any new subjects but only to such infants as, before April 26, had already received the first inoculation, which was probably decisive as regards the transmission of the infection.

6. It is subject to censure that the persons who were responsible for the application of the protective vaccine, among whom there seems, too, to have been a lack of cooperation, did not inform until a late date the center in Lübeck having first jurisdiction in such matters, of the damage that had been done. The *Reichsmedizinalverwaltung* (federal administration of medical matters) was not informed of the events until May 14.

To what extent the charges, or censures, mentioned (which do not essay to pass a judgment on the scientific merits of the Calmette procedure) should or may be considered in determining the matter of culpability, will be established by the criminal procedure, which has already been instituted.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

INTRA VITAM TECHNIQUE FOR THE STUDY OF THE LIVING CELLS OF INSECTS

THE method of studying living germ cells as practiced by Lewis and Robertson,[1] Strangeways and Canti,[2] Bélâr[3] and others shows certain lacks and deficiencies. These are evidenced by the appearance of pseudopodia, fused cells and nuclei and other abnormalities. Such irregularities do not appear in well-fixed material and we do not believe that they are a part of the behavior of germ cells in normal conditions of development.

We have been able to develop a technique for insect germ cells in which such abnormalities do not appear, due to the fact that the body pressure (follicular and cystic) and specific ferments are not disturbed. Neighboring cells are not separated from each other or from the surrounding tissues. Hence no fusion of spermatocytes or spermatids occurs, nor do

[1] M. R. Lewis and W. R. B. Robertson, (II) "The Mitochondria, etc., in Chorthippus," *Biol. Bull.*, 1916.

[2] T. S. T. Strangeways and R. G. Canti, "The Living Cells in Vitro as Shown by Dark Ground Illumination and the Changes Induced in Such Cells by Fixing Reagents," *Quart. Jour. Micr. Sci.*, 71, 1927.

[3] K. Bélâr, "Beiträge zur Kausalanalyse der Mitose. II. Untersuchungen an den Spermatocyten von *Chorthippus lineatus*," *Arch. Entw. Mech.*, 118, 1929.