

Out of 138 explosions there were :—

21	explosions when the barometer stood between 29° o and 29° 49 in.
56	" " " 29° 5 " 29° 99 "
54	" " " 30° " 30° 49 "
7	" " " 30° 5 " 30° 8 "

Furthermore, there were :—

48 explosions when the barometer was rising

79 " " " falling

20 " " " steady or slightly fluctuating.

I also compared the colliery warnings issued in the first half of 1905 with the explosions that took place. There were in those six months 62 days on which explosions took place out of about 155 working days, so that if a date should be selected at random, the probability that an explosion would occur on that day or the day following would be about 4 to 1; during those six months there were fifteen warnings issued, only six of which were followed within forty-eight hours by an explosion, so that the Press Association only hit upon a dangerous date once in less than ten times. Obviously it could do better if it trusted to chance alone, and if the matter were not such a serious one, I should be tempted to advise the newspapers concerned to turn over the subject of colliery warnings to their sporting tipsters. Over a series of years the average number of explosions was about 150 per annum, and the average number of warnings about 25, so that even if every warning were followed by an explosion, only one explosion in six would have been foretold.

Of course, it is every explosion that must be taken into account, and not only serious explosions or those attended by loss of life. Whether a small gas explosion occurs doing no damage at all, or whether the explosion extends throughout the whole of a colliery, killing its hundreds, is obviously determined by the circumstances of the case, and is independent of barometric fluctuations; indeed, modern researches are forcing us very near to the conclusion that in present-day colliery practice every serious extensive explosion is a coal-dust explosion rather than a gas explosion, though the latter may, and very often does, originate it. In fairness to the news agency, I may point out that when the barometer is high there is a likelihood that the coal-dust in a mine may be drier than when it is low, and it is possible, though not proved, that in these circumstances the risk of a coal-dust explosion may be somewhat greater. This consideration, however, does not affect the general conclusion that the colliery warnings as issued by the Press Association, which pointedly refer to firedamp, are misleading, and would be harmful but for the fact that most colliery managers know too much about the subject to pay any attention to them.

I hold that it would be a real service to the mining community if the Meteorological Office would send out notice whenever an area of considerable barometric depression is approaching our shores as long in advance as possible, so as to warn colliery managers to be on the look out for a fall in the barometer.

I understand that similar predictions are furnished to farmers at harvest time for a small fee, and surely if this can be done where material interests alone are involved, it is not too much to ask for the like assistance where men's lives are at stake. It is not at all certain that the influence of barometric changes upon the possibility of colliery explosions is of any great importance, but in matters of such supreme gravity, no precaution, however trifling, should be neglected.

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SOURRED MILK AND ITS PREPARATION. LACTIC CHEESES.

In a former article¹ the nature, preparation, and uses of soured milk were dealt with. It was pointed out that the consumption of sour milk is widespread in the East, that in all the sour milks a peculiar micro-organism is present, with artificial cultures of which it is possible to prepare soured milk in imitation of the natural product, and that soured milk tends to lessen intestinal putrefaction and seems to be beneficial in many complaints. The micro-organism (*Bacillus bulgaricus*) present in all the natural sour milks is one possessing distinct and special characteristics, though exhibiting marked variation or "pleomorphism," and Makrinoff,² who has critically studied the question, believes that all the varieties which have been described are referable to one species. Two more or less distinct *races* seem to exist, namely, one that produces a somewhat viscous product, another that does not, and for the preparation of soured milk the latter is to be preferred as yielding a more palatable product. The morphological and staining characters of the *Bacillus bulgaricus* are so distinctive that

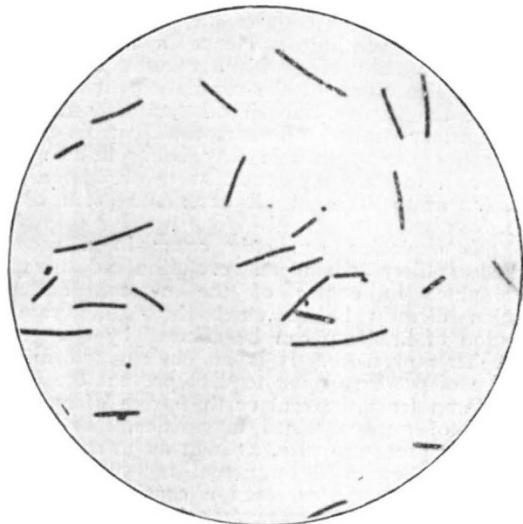


FIG. 1.—Film of properly soured milk, showing presence of the *B. bulgaricus* only (Gram, $\times 1200$).

a microscopical examination, combined with the Gram staining process, of the soured milk, enables us to judge to what extent the *B. bulgaricus* has developed, and whether there is contamination with other organisms (Figs. 1 and 2).

For the preparation of soured milk it was pointed out that the milk must be properly sterilised by adequate boiling, inoculated with a proper "starter," that is a culture of the *B. bulgaricus*, and incubated for from 12 to 24 hours at a temperature of 105° to 110° F. Starters may be obtained in the liquid and solid (tablet) forms, but unquestionably the liquid are far superior to the solid ones. Thus Quant³ examined certain tablet preparations, and compared them with a liquid culture as regards flavour of, and production of lactic acid in, the soured milk produced. The liquid culture produced 2·34 per cent. of lactic acid B.P.,⁴ the tablets yielded only 0·07 to 0·42 per cent. of lactic acid B.P.; moreover, the curd and flavour were unsatisfactory with the latter. Quant also

¹ NATURE, April 7, 1910, p. 159.

² Centr. f. Bakter., Abt. II, Bd. xxvi., 1910, p. 374.

³ Brit. Med. Journ., 1909, ii., p. 1738.

⁴ B.P.=British Pharmacopoeia.

directs attention to the importance of a proper incubation temperature. He found, using the liquid culture, that the yield of lactic acid at 105° F. was more than one and a half times that at 85° F., and more than one and one-third times that at blood heat, 98.4° F. Samples of five preparations were also examined for the *British Medical Journal*¹ with the following results :—

Percentage of Lactic Acid Produced.

Sample	After 10 hour's incubation
(1) Fluid culture (Oppenheimer) 0.96
(2) Fermenlactyl tablets 0.00
(3) Lactobacilline 0.02
(4) Sauerin 0.07
(5) Trilactine 0.27

From this table it will be seen that the liquid culture is far superior to the tablets. The writer also examined² liquid sauerin, and sauerin, trilactine, and fermenlactyl tablets, and of these the liquid sauerin alone could be considered satisfactory.

In response to a request by the editor, several firms have been good enough to furnish preparations which

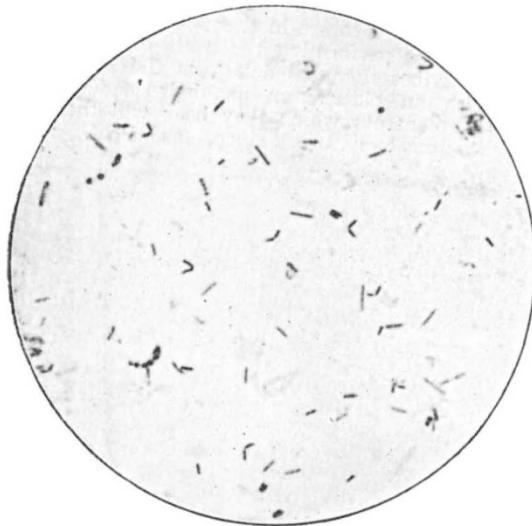


FIG. 2.—Film of soured milk prepared with tablet starter. Numbers of small Gram-negative bacilli present (Gram and eosin, $\times 1200$).

have been examined by the writer with the following results :—

I. Content of *B. bulgaricus* :—

(1) Tablets.

(a) *B. bulgaricus* present in $1/100$ and $1/1000$ of a tablet, not in less. Streptococci also present.

(b), (c), (d) Very few *B. bulgaricus* present, even in $1/100$ of a tablet; milk not curdled.

(2) Fluid Culture.

(a), (b), and (c) *B. bulgaricus* present even in $1/100,000,000$ c.c. No streptococci.

(3) Tablets.

(a), (b), and (c) Very few *B. bulgaricus* present even in $1/100$ of a tablet; milk not curdled.

(4) Lactic Cheese.

B. bulgaricus present in $1/100,000$ gram, not in less. Streptococci present.

(5). Sour Milk Cream Cheese.

B. bulgaricus present even in $1/100,000,000$ gram. Streptococci present.

From this it will be apparent that the fluid preparation (No. 2) has a content of *B. bulgaricus* enormously

greater than the tablet preparations (Nos. 1 and 3). The lactic cheeses, if fairly fresh, contain a high content of *B. bulgaricus*, and are a pleasant and wholesome addition to the diet.

II. Characters of soured milk made with the preparations :—

(1) Tablet.—Milk markedly curdled. Acid, but somewhat cheesy odour. *B. bulgaricus* present in moderate number, also streptococci. Gram-negative bacilli present.

(2) Fluid Culture.—Milk well curdled. Acid, pleasant odour. Abundance of *B. bulgaricus*; no other micro-organism.

(3) Tablet.—Milk curdled, but *B. bulgaricus* scanty. Gram-negative bacilli present.

The result of these tests is to show that the tablet preparations do not produce a satisfactory soured milk, and the product is contaminated with bacilli other than the *B. bulgaricus* (see Fig. 2). The fluid culture, on the other hand, yielded an excellent soured milk, the flavour of which, however, would probably be improved if lactic streptococci were present in addition.

Special lactic acid-producing streptococci (e.g. *S. lebensis*) are always present in the natural sour milks, they aid the rapid growth of the *B. bulgaricus* by producing an acid environment, they tend to lessen the separation of the curd, and, in the writer's opinion, render the soured milk more palatable.

The small content of *B. bulgaricus* present in dry tablet preparations renders these comparatively inefficient for internal administration, and not to be compared with the ingestion of even a few cubic centimetres of properly soured milk.

I am indebted for the photomicrographs to Mr. J. E. Barnard.

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THE BRITISH SCHOOL AT ATHENS.¹

THE fifteenth volume of the "Annual of the British School at Athens" is somewhat less in bulk than its immediate predecessor. Probably its present length is about the extreme of what is convenient for a book of this format. The most important articles, as before, are those which describe the continuation of the work of the school at Sparta, which has been so successful, and has conferred such great distinction upon British archaeology in Greece. Mr. Dawkins, the director, describes the work generally, and the conclusion of the excavation of the sanctuary of Artemis Orthia, and Mr. Droop the pottery, with regard to which he has made important discoveries which have given us quite a new idea of the history of ceramic art in the Peloponnese. The long list of inscriptions recovered in the sanctuary of Artemis Orthia is finally disposed of by Mr. A. M. Woodward, who appends to his admirable and painstaking work a series of corrections of re-discovered inscriptions which had previously been copied by Fourmont.

The main part of this section of the "Annual" is devoted to the description of the Menelaion, the *heroon* of Menelaos and Helen, of whom the latter, at any rate, seems to have been originally a minor deity, a nature-goddess, akin to Artemis Orthia herself. The shrine is placed on a hill a little to the south of Sparta, and was solidly built on a strong revetment-wall of great stone blocks, to which the top of the hill serves as a core. This imposing work is probably of the fifth century B.C., but the explorers found many traces of far older occupation, going back to the Mycenaean period.

A large number of smaller antiquities were dis-

¹ "The Annual of the British School at Athens," No. xv. Session 1908-9. Pp. viii+412+20 plates. (London: Macmillan and Co., Ltd., n.d.) Price 25s. net.