

been driven to the verge of extermination by the plume hunters. A strong public sentiment has been raised of late in favor of these species, not only in this country, but in various countries of Europe. Under the present conditions the organized bird protectors of this country, the Audubon societies, had looked for an increase in these species under our more recent laws regarding birds, but it is plain to see that should the tendons become popular with our surgeons for ligature and suture purposes the birds might have a still greater enemy. I do not consider the statement sweeping when I say that the extermination of some species would be only a matter of time.

However, as the author concludes: "Think of the comfort to the civil or military surgeon in isolated places of knowing that he can have a suture material at the end of his shot gun."

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NOTE ON THE OCCURRENCE ON GRAIN OF ORGANISMS RESEMBLING THE *BACILLUS COLI COMMUNIS*.

It is a well-known fact that bacteria exhibiting the reactions of the *Bacillus coli communis* are widely distributed in nature, being found even on material least liable to pollution from any animal sources. Thus Prescott\* has shown the occurrence of colon forms in wheat flour, corn meal, breakfast foods and various other food-stuffs only remotely liable to infection, as they are handled only on the large scale and in the open field or large mill. He also demonstrated their constant presence on certain grains—oats, barley, rye, wheat, buckwheat—taken directly from seed-warehouses and stores but slightly liable to contamination. Papasotiriou† has also demonstrated the presence of such forms on grains, showing them to be commonly present when small numbers of grains were studied. In his investigations cultures of ten kernels each of wheat, rye, barley, oats, peas, beans and corn were made in dextrose broth in triplicate,

fourteen out of the twenty-one cultures giving positive results. The presence of these simulating forms in dough and articles manufactured from the hexoses has been studied carefully, especially by Lehmann and his pupils;\* since, however, during the preparation such food-stuffs could become readily infected by the necessary handling, the results have less importance from the sanitary standpoint.

During the past months I have made some further investigations to determine whether bacterial forms simulating closely in their behavior the *B. coli communis* were present on grain which in all probability could not have become contaminated by direct contact with faecal matter. In all investigations thus far reported some doubt may be cast on the integrity of the samples, or at least there is a possibility of contamination from handling or manufacture. In November, 1904, a field of rye was found in western Massachusetts which, owing to the scanty growth, had not been cut. The field is on light soil, on a level, open, sandy plain, and stands well back from a country road not heavily traveled. Inquiry showed that the field had not been fertilized and that no cattle had ranged through the grain during the fall. This stand of grain, therefore, may be taken as a typical open country growth free from contaminating influences. From this field heads of grain were picked with sterilized forceps and put into sterilized glass tubes. These heads were incubated separately in bouillon for twenty-four hours and then differentiated out through lactose-litmus-agar into pure culture, following the usual procedure. At the first test eight heads were thus treated and one gave abundant growth of an organism which repeatedly showed the characteristics of *B. coli communis*, and allied groups of organisms, solidifying and decolorizing litmus milk, giving a white expansive growth on agar, a heavy growth in bouillon, fermentation in dextrose broth with fifty to eighty per cent. gas production, fermentation in lactose broth with thirty to forty per cent. gas production, heavy indol reaction, heavy reduction of nitrate and a dirty yellowish growth on acid potato.

\* See papers in *Archiv für Hygiene*.

\* SCIENCE, New Series, Vol. XV., No. 375, 1902, p. 303.

† *Archiv für Hygiene*, 1902, Vol. XLI., pp. 209-210.

On December 10 a second lot of heads was secured in the same manner from the same field, and fifteen heads were treated as before; of these, four different heads yielded organisms exhibiting the above reactions characteristic of the colon group, the gas from the dextrose fermentation tubes in this series being more nearly that of the true colon type, varying from thirty to fifty per cent. and with a ratio of two to one.

On January 11 eleven more heads which had been kept in the glass tubes in the laboratory were subjected to the same procedure and one gave exactly the reactions of the *B. coli communis*. In all, therefore, at different times thirty-four heads from this field of rye were studied and from six of them organisms were isolated giving the reactions of the colon bacillus with the ordinary media. It will be recalled that these heads were taken at random over the whole field after they had stood through the storms of the fall, and snow of the early winter. Other heads of the rye gave indications of these acid forms, but did not exhibit the reactions typical of the colon group of organisms so decisively as those included above.

These results possess considerable interest from both the theoretical and practical standpoints. The question as to their origin first naturally arises. It is evident that either: (a) Colon forms must have been transported through the air as dust or carried by insects contaminated with animal excrement and thus deposited on the grain; or, (b) on these grain heads bacteria normally occur which in the several cultural processes exhibit most marked resemblances or absolutely correspond to the *B. coli communis*, or the colon group.

On the first assumption it is difficult to explain the persistence of these forms on grain, and especially on so large a proportion of the heads of grain distributed over an unfertilized field far removed from travel. If, however, this view be untenable, the other proposition must be accepted, viz., that forms of bacteria occur on natural grains closely resembling in their habit the distinctively faecal forms, and which in our present methods of study can not be distinguished from them. It is ex-

tremely suggestive that these forms are so commonly present on most of the cereals thus far studied, being found even, as shown above, on standing grain before its harvesting, with the probabilities so against any contact contamination.

Further, the relation of these forms to the study of the pollution of natural waters is of the utmost importance. Whatever may be the source of the original seeding individual, the fact of their presence on the grain-heads suggests sources for the so-called colon bacilli in streams other than direct sewage pollution, and the presence of such 'colon forms' must be interpreted most carefully. Certainly the old hard and fast rule concerning the significance of the presence of any 'colon forms' as *prima facie* evidence of sewage pollution must needs be most discriminatingly applied.

It is unfortunate that the season of the year and locality where these experiments were carried out requires the postponement of further investigation until another season. Meanwhile the writer would value any suggestions or data bearing on this study, especially from the agricultural experiment stations, the publications from which may contain researches on these grain organisms which thus far have not fallen under his notice.

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#### CURRENT NOTES ON METEOROLOGY.

##### ALTITUDE AND ACCLIMATIZATION IN THE TROPICS.

IN a recent summary of the 'Report of the Census of the Philippines' (published April 8) which appears in the *National Geographic Magazine* for April, 1905, the following sentences are found: "That long exposure to the climate is enervating there can be no doubt, but the effect is easily avoided by periodical changes to a colder climate. This has been conclusively proven by the old Scotch, English and other white residents, who, after a residence of over forty years, broken by such removals, enjoy excellent health. Formerly it was necessary to take a sea voyage in order