action upon the bacteria. Details are given in the following table.

The action of radium rays upon the diphtheria bacillus (*B. diphtheriæ*) was next studied, the methods employed being the same as with *B. coli*. This organism was selected (1) because it may be regarded as a typical pathogenic microbe; and (2) because it has been suggested that radium, on account of its germicidal action, may be conveniently applied in the treatment of diphtheria. In such treatment the radium is to be encased in special tubes (to be obtained from dealers in radium) and these tubes inserted in the throat, whereupon, it has been claimed, the organisms will be destroyed. It has even been hinted that radium may replace antitoxin in medical practice.

Two cultures of *B. diphtheriæ* were experimented upon—one a laboratory culture of several generations since isolation, the other a recently isolated, virulent culture. As with *B. coli* the length of the exposure to the action of radium varied considerably, and in all cases the results were negative, as will be seen from the table.

Organism.	Distance from Radium.	Time of Exposure.	Result.
B. diphtheriæ	2 cm.	20 min.	Neg. Growth not inhib.
" "	1 "	20 "	" " " "
" "	2 "	30 "	" " " "
" "	1 "	30 "	" " " "
" "	1 "	40 "	" " " "
" "	1 "	50 "	" " " "
" "	1 "	60 "	" " " "
" "	1 "	70 "	" " " "
" "	1 "	80 "	" " " "

No experimental evidence whatever was obtained which would indicate that any degree of success can be hoped for in treating diphtheria by destroying the specific micro-organisms by means of radium rays.

A few experiments were also made to determine the action of radium on fungi other than bacteria, and for this purpose domesticated yeast (*Saccharomyces cerevisiæ*) was employed as a type of the blastomycetes. The method differed from that used with *B. coli* and *B. diphtheriæ* only in the fact that a wort-gelatine medium replaced nutrient agar, and that the plates were incubated at 25° instead of at 37°. As in the experiments with bacteria, negative results only were obtained, the most careful scrutiny failing to reveal any destruction, or even any inhibition, of the life or growth of the micro-organisms.

Organism.	Distance from Radium.	Time of Exposure.	Result.
Sac. cerevisiæ	1 cm.	20 min.	Neg. Growth not inhib.
" "	1 "	30 "	" " " "
" "	1 "	40 "	" " " "
" "	1 "	60 "	" " " "
" "	1 "	80 "	" " " "

These experiments and the conclusions to be drawn from them may be summarized by the following statements.

1. Radium rays have no effect upon fresh cultures of *B. coli, B. diphtheriæ,* or *Saccharomyces cerevisiæ* at a distance of one centimeter when the time of exposure is less than ninety minutes.

2. Any advantages derived from the therapeutic use of radium must be explained in some other way than by the direct weakening or destruction of the micro-organisms of disease.

3. The use of radium tubes in the treatment of diphtheria can not be recommended or regarded as a substitute for antitoxin.

In conclusion, I desire to express my obligation to Dr. F. H. Williams for the opportunity to carry on these experiments, and for many helpful suggestions.

S. C. Prescott.

The Biological Laboratories,
Mass. Inst. Technology,
July 30, 1904.

A WHEAT-RYE HYBRID.

To the Editor of Science: A few preliminary notes as to distribution of parental characters observed in the above type of hybrid grown by the writer during the present season may be interesting. The cross was obtained in May, 1903, by using a Russian variety of rye as the pollen- and Jones' Winter Fife as the seed-parent. No reciprocal crosses were attempted. Several seeds resulted, of which a few showed apparent xenia, the blue-gray color of the rye seed-coat being very evident

in the hybrid seed in some cases. Grown through the past winter and spring, and coming into maturity during July, it became apparent as the heads came out, that but one of the supposed hybrid plants was to exhibit rye characters in its gross morphology. This one, however, is most interesting. The general type of the head is that of the rye throughout, long, narrow and nodding. The spikelets have the elongate narrow form of rye spikelets, but lack the awns on the flowering glumes, which are, moreover, markedly pubescent like those of the wheat parent. The empty glumes are of the *Triticum* rather than the *Secale* type. In form of outline the anthers differ altogether from those of either parent. The leaves of the hybrid were free from the rust that affected the wheat parent. Four heads were produced by the hybrid plant, all of which were alike in type. Variance among the different heads borne on the same plant has been observed by the writer in the case of wheat variety-hybrids. But in this instance no such phenomenon was evident. Any observer would have recognized at a casual glance the extraordinary rye form in the entire group of hybrid heads. Material killed in Flemming's solution of the sporophyte vegetative structures and of stages in the development of the spores in the hybrid and of both of its parents, will be studied later, with respect to cytological details. It should be stated that attempts at crossing the rye again on the hybrid failed, and that none of the hybrid flowers became self-fertilized with one exception. The result, however, is a seed badly shriveled in the region of the embryo, and which does not promise germination.

H. F. ROBERTS.

KANSAS EXPERIMENT STATION,
MANHATTAN, KANSAS,
July 29, 1904.

NOTES ON INORGANIC CHEMISTRY.

THE MELTING POINT OF GOLD.

No little work has been done in recent years on the determination of the melting point of pure gold, as owing to the ease with which gold can be obtained in a very pure condition, this affords a valuable constant for high temperature work. In the latest experiments, which have been carried out by Jacquerod and Perrot and described in the *Comptes Rendus,* advantage has been taken of the fused quartz nitrogen thermometer, as owing to the small coefficient of silica, the correction for the expansion of the bulb is very small. The gold was heated in a special type of electrical resistance furnace, in which the temperature could be very accurately controlled, and the comparison with the thermometer was direct. The fusing point was found to be 1067.2° C. which is slightly higher than the 1061° determined by Callendar, Heycock and Neville, but lower than some other recent determinations.

FUSED SOAPSTONE FIBERS.

THE use of fused quartz was first brought to notice by Professor Boys, who found that quartz could be drawn into exceedingly fine fibers, which especially on account of their small elastic fatigue were superior to all other fibers for suspensions. From this beginning, by the labors of Professor Shenstone and others, the possibility of using fused quartz on a much larger scale has been realized, and now all the commoner forms of laboratory utensils can be made of this material. The chief advantages are the great resistance of quartz to most reagents, and its small coefficient of expansion. In a recent number of the *Physical Review,* Mr. K. E. Guthe shows that fused soapstone can be used to some extent like fused quartz. When heated in the gas-oxygen flame, it melts readily to a clear glass and can be drawn out into very fine fibers which have all the advantages of quartz fibers, and it is possible that other industrial uses may be found for it.

EXPLOSIONS FROM FERROSILICON.

LAST January two mysterious explosions took place at Liverpool in drums containing ferrosilicon. The cause of these explosions has been investigated by A. Dupré and M. B. Lloyd, and a paper dealing with the subject was read by them at the meeting of the Iron and Steel Institute. They consider that the probable cause of the explosions was the presence in the drums of water, which by its action upon the ferrosilicon occasioned the gen-