The composition of pyrophosphate of zinc is as follows :

2 Zn	130	42.763 per cent.
2 P	62	20.395 "
7 O	112	36.842 "
$Zn_2P_2O_7$	304	100.000

or,

2 ZnO	162	53.29 per cent.
P_2O_5	142	46.71 "
$Zn_2P_2O_7$	304	100.00 "

Nickel and cobalt form phosphates which behave precisely like the corresponding zinc salt ; both, however, are strongly colored, and so can readily be distinguished from phosphate of zinc.

VIII. METHYL VIOLET TEST PAPER.

By T.O'Connor Sloane A. M., Ph. D.

Several years have passed since it was first proposed to use methyl violet as an indicator or test for mineral acids in the presence of organic acids. Since it has also been used as a coloring matter for test paper it occurred to me that a few notes on the preparation and use of the paper would be of interest.

I tried solutions of methyl violet of different strength in dyeing paper. A solution of one part of violet in four thousand parts of water was found to be sufficiently strong. A solution of double this strength gave a very good color.

Using paper dyed with the first solution I performed the following experiments:

One cc. of concentrated hydrochloric acid was mixed with him one hundred cc. of water. The acid was of sp. gr. 1.197 corresponding to about 40 per cent. acid; the solution therefore was of four one thousands strength or four-tenths of one per cent.

A piece of paper dipped in this solution did not show the reaction except on drying ; then it came out perfectly. A piece made from a violet solution of half the strength showed a little; this acid seemed therefore to be close upon the limits of sensibility for an immediate reaction.

It will also be noticed that the more weakly colored paper was slightly more sensitive ; on drying the darker paper shows as well or better.

The acid was diluted to one-fifth its former strength or eight hundredths of one per cent. I now adopted the following way of operating: A convex cover was placed on a water bath, the water in which was heated to boiling; each piece of paper as dipped was laid on the upper convex surface of the cover; this dried it in about one minute; in practice this will be found an excellent way of using the paper.

The standard paper dipped once and dried showed the reaction, but not strongly; a second dipping and drying brought it out perfectly; a third treatment made the reaction still stronger.

When a paper colored by this weak acid was dipped a second time the previous change of color was indiscernible until it had dried again.

The acid was reduced to four-hundredths of one per cent.; the paper just showed the reaction after one dipping and drying; a second treatment developed it perfectly.

The acid was next reduced to two hundredths of one per cent. strength; the reaction appeared after three to five treatments but very faintly.

About the same results were obtained with sulphuric acid of corresponding strengths.

The series of experiments indicates pretty closely the limits of sensitiveness; drying the paper cannot be too strongly insisted upon; independent of any concentration of acid thus effected, the color change which is masked to a great extent by moisture is made visible by drying.

IX. DIPHENYLAMINE—ACROLEIN.

By Albert R. Leeds.

25 grms. of diphenylamine, in alcoholic solution, were treated with acrolein in excess, and after standing, the loosely-corked flask was gently warmed for a number of hours, until the smell of acrolein had nearly disappeared. A bulky dark red precipitete was formed. On boiling with alcohol a deep red solution was obtained and the portion undissolved formed a tenacious sticky mass, very awkward to work with. By repeated boiling with water under a return cooler this mass gradually lost its sticky nature. It was then digested alternately with boiling water and alcohol, until at last the mass became pulverulent and could be ground up in a mortar. The operation of boiling was then repeated many times, the