This invention relates to the treatment of chemical wood pulps, particularly kraft, sulphite and soda pulps. I have found that chemical wood pulps can be effectively lightened in color by the addition of hydrosulphites in organic combination. The principal representatives of these compounds are given in the following:

Sodium hydrosulphite formdehyde

\[ \text{NaSO}_2\text{C=CHO} \]

Zinc hydrosulphite formdehyde

\[ \text{ZnSO}_2\text{C=CHO} \]

Chemical pulps, when ready for the bleaching operation usually have a pH very close to that of an alkaline condition, sulphite pulp normally running between 6.5 and lower, and kraft and soda pulp between 6.8 and 7.5. I have found that a satisfactory bleaching operation can be secured if the pH of the pulp is adjusted in any suitable manner, as by addition of a suitable alkali, alkaline salt, acid or an acid salt, so that the pH is in the neighborhood of 5, and preferably between 4 and 7. The pH of the pulp is usually out of the range specified and beyond 5. If it is too high I add an alkali or an alkaline salt as borax, soda ash and lime. If it is too alkaline I use a suitable acid or acid salt and I have effectively utilized sodium acid sulphite, phosphite, sulphur dioxide, sulphite cooking liquor, and as the acid sulphuric acid.

Calcium salts can be used with sulphite but not with kraft pulp.

As suitable compounds which I can use I mention any aldehyde or ketone addition product of hydrosulphurous acid. In the formulas hereinbefore set forth the aldehyde can be any other aldehyde, such as acetaldehyde, or the aldehyde can be substituted by a ketone, such as acetone or any other ketone, while the metal can be replaced by zinc, potassium, magnesium or by the ammonium radical. The outstanding characteristics of the compound used in accordance with this invention are that they are quite stable at ordinary temperatures, and that their bleaching effect is exerted between about 100 deg. F. and 212 deg. F.

In utilizing the process of my invention I either add the compound as a solid, in the form of a solution, to the material to be bleached, or else I form the compound in situ in the material undergoing bleaching. Thus, I have bleached pulp by adding to the hot pulp at about 130 deg. F. zinc hydrosulphite formdehyde in a small amount, usually between 0.25% and 3%. The pulp reduced quickly in color and finished with a considerably lighter and more permanent color than one bleached with the usual reducing bleaches. I have also successfully bleached pulp by forming the hydrosulphite formdehyde directly therein by methods well known for the manufacture of this material. For instance, zinc hydrosulphite formdehyde can be produced directly from zinc hydrosulphite and formaldelyde, or from zinc dust, formaldeyde and a sulphite.

In one process conducted according to my invention, I added to 100 pounds (air dry basis) of sulphite pulp sufficient water to make the pulp up to a 5% density. The pulp suspension was at 140 deg. F. and slightly below the preferred pH of 5. I added 0.3 pound of borax to the suspension and then a pound of zinc hydrosulphite and half a pound of a 30% formaldehyde solution. In ten to fifteen minutes the pulp brightened materially, and in less than thirty minutes the maximum brightening was attained. The bleach is then drained off and the pulp made into paper. Both ketones and aldehydes form addition products with a hydrosulphite so that any aldehyde or ketone can be used. The simplest formula for an aldehyde and a ketone is:

\[ R-C-R' \]

where \( R' \) is hydrogen for an aldehyde and any organic radical for a ketone wherein a carbon is bonded to the carbon in the formula. Any aldehydic or ketonic compound, aliphatic or cyclic, including carbocylic as well as heterocyclic, within these formulas can be used.

I claim:
1. The process of bleaching a chemical pulp comprising subjecting said pulp to the action of an aldehyde and a hydrosulphite at a pH substantially between 4 and 7, and at a temperature between 100 deg. F. and 212 deg. F.
2. The process of bleaching a chemical pulp comprising subjecting said pulp to the action of a ketone and a hydrosulphite at a pH substantially between 4 and 7 at a temperature between 100 deg. and 212 deg. F.
3. Bleaching a chemical pulp at a temperature between 100 deg. and 212 deg. F. and a pH between 4 and 7 with an addition product of hydrosulphurous acid and an organic compound of the formula:

\[ R-C-R' \]

where \( R \) is an alkyl or aryl group and \( R' \) is hydrogen or any alkyl or aryl group.
4. Bleaching a chemical pulp at a temperature between 100° and 212° F. and a pH between 4 and 7 with an addition product of hydromelphurous acid and an organic compound of the formula:

\[ R-C-R' \]

where \( R \) is any organic radical and \( R' \) is hydrogen or any organic radical.