THE CANADIAN

When the upper corner stay bolts and others next to the flange of the throat sheet are found leaking, it is evidence of the strain put upon them when the boiler bends up or down. There is some spring between the flange and these stay bolts, but little or none in the upper sides, where the cracks take place. This spot may be looked upon as the fulcrum of the lever, as it receives the direct crushing effect, alternating as the boiler bends. The weight of the barrel and its contents, with the cylinder bolted to the smoke box, acts like a weight on the end of the lever, keeping that end of the boiler down and binding it to the frames.

These destructive strains mentioned may be regarded as mechanical, while at the same time there are still some serious strains caused by the unequal expansion and contraction, due to heating and cooling. We have heard it said that certain boiler explosions were due to the act of God, but as a rule the neglect of inspection and proper reports by the men in charge are the real origin of the disaster.

WATER IN BOILERS.

Water contains two classes of mineral salts, the incrusting and the alkali salts, the amount of which determine its fitness or unfitness for use in locomotive boilers. The sum of these would represent the total solids dissolved in the water, and would be the residue left on evaporation. Total dissolved solids:

- 1. Incrusting matter or total hardness.
 - a. Temporary hardness or carbonates of lime and magnesium.

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