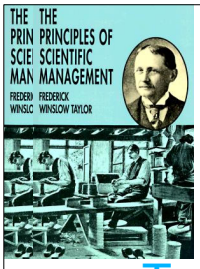
FC for Group-1 Officers:
Mgmt. & Behaviour Studies, Session-05

Taylor's "Scientific Management" shifting grains from chaff..

Dr. Prasanta Mahapatra

31-07-2012

Dr.MCR HRD Institute of Andhra Pradesh



Today's Readings

a. Taylor Frederick Winslow. The Principles of Scientific Management. New York, Harper & Bros., 1919 (Originally published in 1922) from the collection of the Prelinger Library, San Francisco, California, digitized by the Internet Archive in 2006.
b. Excerpts from Chapter-2 of the Principles of Scientific Management by Frederick Winslow Taylor, with photographs added by the National Humanities Center, Research Triangle Park, NC, USA, 2005.
c. Caldari Katia. Alfred Marshall's critical analysis of scientific management. European Journal of the History of Economic Thought. 2007 Mar; 14(1):55-78.

Frederick Winslow Taylor

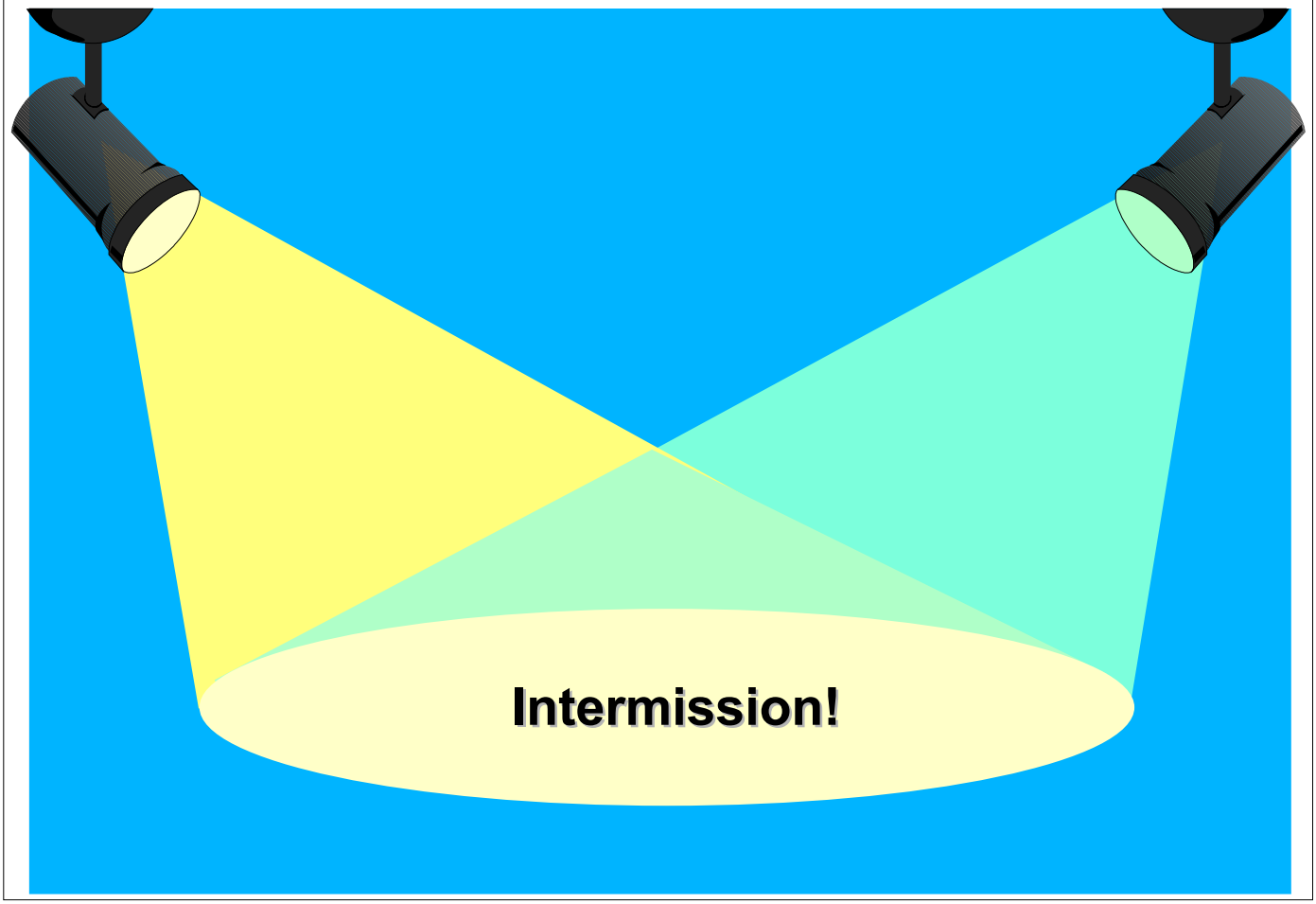
- 1856 - 1915, born to wealthy parents in Philadelphia, Pennsylvania, USA.
- 1874: High School from Exeter Acad., NH.
- 4Y apprenticeship in machine tools mfg.
- 1878: Midvale Steel as machine shop laborer.
- Quickly promoted to time clerk, Journeyman machinist, gang-boss over machine hands, machine shop foreman, research director and finally Chief Engineer of Works.
  - ►Part talent & part family connection with one of the owners of Midvale Steel.
- 1883: Degree in Mech Eng. by corrsp. course.
- 1890-93: GM & Consulting Eng at Manuf. Invest. Co, Philadelphia. Plant Mgr to build a new paper mill in Maine.
- 1893: Independent Consultant.
- 1895: Ti: A Piece-Rate System.
- 1898: Joins Bethlehem Steel. Developed high speed steel and solved machine shop capacity problem, in collaboration with Maunsel White.
- 1901: Leaves Bethlehem Steel due to antagonisms with other mgrs.
- 1903: Ti: Shop Management.
- 1906: Ti: Art of Cutting Metals.
- 1906-07: President American Society of Mechanical Engineers (ASME). Troubled tenure.
- 1910: Advocate Louis Brandeis coins the term Scientific Management to argue before Interstate Commerce Com on the Eastern (Rlys) rate case [See Caldari p58 footnote-4, CP#310].
- 1910 Aug: A group of molders in Water town Arsenal strike work for introduction of time studies.
- 1911: Taylor updates "Shop Management" but ASME declines to endorse. Taylor releases the book directly, adopting Brandeis's term. 'The Principles of Scientific Management.'
- 1911 Aug: US Congress Spl Committee to investigate the Taylor & other systems of shop management.
- 1912 Mar: US Cong Com. Report:
  - ►Neither Taylor system nor any other should be imposed from above on an unwilling workforce.
  - ►Any system of shop management ought to be the result of mutual consent.
  - ►Standardization & systematization were fine.

Late 1800s

- Industrialization was progressing fast.
- Accelerating competition between firms.
- Firms were also growing in size.
- More and more workers employed on a single shop floor.
- Growing need for increased control of these massive workers.
- Need for the workers to work more efficiently.

Taylor's view point, late 1800s

- Workers did not work hard enough (Soldiering).
- "We can see our forests vanishing, our water-powers going to waste .... The end of our coal and iron is in sight. But the larger wastes of human effort, which go on every day through such of our acts as are blundering, ill-directed or inefficient are less-visible, less tangible and are but vaguely appreciated...." - Taylor, p5
- Taylor was shocked that "As yet there was no public agitation for greater national efficiency'...
- "...in a majority of cases the man deliberately plans to do as little as he possibly can- to turn out far less work that he is well able to do - in many instances to do not more than one-third to one-half of a proper day's work....
- For Taylor "a proper days work" meant the maximum level of output humanly possible and he often called this "a fair day's work" .
- Even best workers are usually oblivious to the science underlying their work.
- They either lack the education or are not mentally smart enough to figure out the underlying science of their work.
- Management's rely on boosting worker initiative but do not pay attention to study & planning for tasks.



Taylor's understanding of 'why did workers soldier?'

Soldiering: Shirking or Eggakotadam in Telugu

1. Workmen's fallacy, that a material increase in productivity will throw a large number of men out of work.
2. Defective mgmt encouraging workmen to soldier.
   a. Practically all employers determine upon a maximum sum which they feel it is right for each class of their employee to earn per day.
   b. Piece rate are eventually adapted to this notion of a days fair wage for a class of employee.
   c. Thus employees, even on piece rate system eventually lose motivation, as their wage eventually settles down to the employer's notion of fair wage, even after increased productivity.
3. Inefficient rule-of-thumb methods.
   a. Even best workers are usually oblivious to the science underlying their work.
   b. They either lack the education or are not mentally smart enough to figure out the

- The greater part of the systematic soldiering is done by the men with the deliberate object of keeping their employers ignorant, how fast work can be done.
- Soldiering was possible because managers did not know how much work it was possible to extract from workers.
- Hence, take this knowledge of work and put it in the hands of the management to be used as a tool for control of workers. Call this scientific management.

Taylor's Pig-iron loading experiment at Midvale Steel.

Pig-IronLoading.wmv

Taylor's Management Consultations:

- Time & Motion:
  - Observe the labour process as it existed.
  - Catalogue all the motions of the workers and time them.
  - There are many different ways in common use for doing the same thing.
  - Devise through trial and error the most efficient flow of motions possible.
- Implement:
  - Identify the large variety in shapes & type of implements used in a trade.
  - Carefully investigate each of the many modifications of the same implement developed under rule of thumb.
  - Design a single standard implement by combining the good points of several implements currently in use.
  - Adopt this standard implement for all workers, until it is superseded by a better designed implement.
- There is always one method and one best implement which is better than any of the rest.
- Characteristics of Taylor designed work places:
  - Authority flowed implacably down from the top and brooked no back talk or resistance.

1. Find, say, 10 or 15 men who are especially skillful in doing the particular work to be analyzed.
2. Study the exact series of elementary operations or motions which each of these men uses in doing the work, as well as implements each man uses.
3. Study with a stop-watch the time required to make each of the elementary movements and then select the quickest way of doing each element of work.
4. Eliminate all false movements, slow movements, and useless movements.
5. Collect into one series the quickest and best movements as well as best implements.

Taylor's Dream world:

- Harmony between classes.
- All workers are employed in occupations where they can work most efficiently.
- Accompanied by a strata of scientific managers who analyze their motions and reorganized them for maximum output.
- Anyone who didn't fit into this perfect vision of the world will be fired.
- Best suited workers: Persons who are too intelligent, too stubborn or physically incapable of working at maximum output are not best suited.
- The greatest prosperity can exist only when the individual has reached his highest state of efficiency, i.e. when he is turning out his largest daily output.
- Only when we fully realize that our duty as well as our opportunity lies in systematically cooperating to train and to make this competent man that we shall be on the road to national efficiency.
- In the past man has been the first. In future the system must be first.
- Fundamental principles of scientific management are applicable to all kinds of human activities. Mgmt of homes, farms, philanthropic institutions, etc.

Taylor's Fantasy:

- All the workers, he was retraining were his personal friends.
- He had their best interest at heart, even if they did not know that.
- He persisted with this fantasy even when workers threatened to kill him.
- "The men who are under me are my personal friends."
- "I use every expedient to make them do a fair days work, such as discharging or lowering the wages of more stubborn man, who refused to make any improvement.

Taylor's discovery of High Speed Steel (HSS) & efficient metal cutting.

- High Speed Steel:
  - Type of tool steels used in tool bits & cutting tools.
  - Can withstand higher temperatures without loosing its temper (hardness).
  - This property allows HSS to cut faster than high carbon steel, hence the name high speed steel.
- 1899-1900: Taylor & White, working with a team of assistants at Bethlehem Steel performed a series of experiments.
- Many different combinations were made & tested and detailed records kept for each batch. (Scientific empiricism).
- Found a heat treatment process that transformed existing alloys into a new kind of steel, namely the HSS.
- Taylor-White process was patented and created a revolution in the machining industries.
- Significant contribution to Taylor's popularity and fortune.
- The patent was hotly contested and eventually nullified.

Taylorism Essence:

- Training
- Equipment
- Tasks.

The problem with Taylor

Mixed up
'Soldiering'
&
Inefficient Organization
of Work.

The Treatment for 'Soldiering' is:

Job enrichment,
Motivation,
Job Satisfaction,
Incentive alignment,
Informal Organizations
&
Leadership.

The Treatment for Inefficient work organization is:

Frank & Lillian Gilbreths

Motion Study,
Workspace Design,
Training,
Tools & Equipment,
Task Assignments.

Frederick Winslow Taylor

Questions?

& Comments