

# Internet University



Presents – Seminar 1

## *The Evolution of Manufacturing*

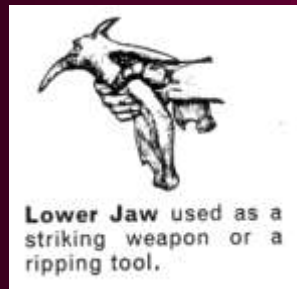
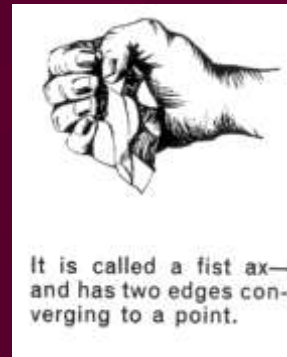
from  
Prehistoric Times  
to  
Present-Day Manufacturing

# Early Ancestors



- They were not protected from the weather.
- Many did not live long.
- Key to survival was their brain.
- They had a hard time to find food and shelter.
- Slow progress in improving living standards.

# Early Hand Tools



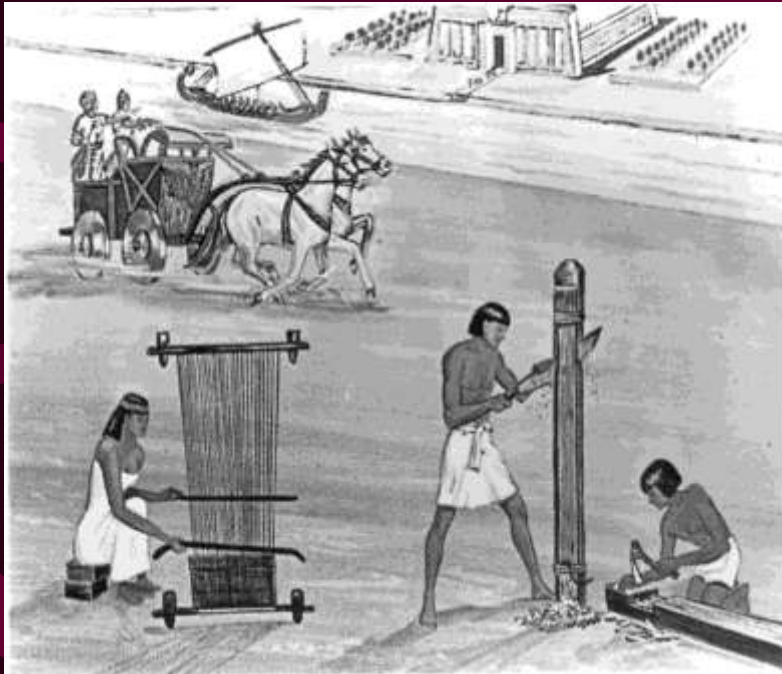
- Humans used things they found as tools.
- They used their hands and muscle power to use the tools.
- Their brain told them how to use tools for different jobs.
- Life was difficult.

# Handles on Tools



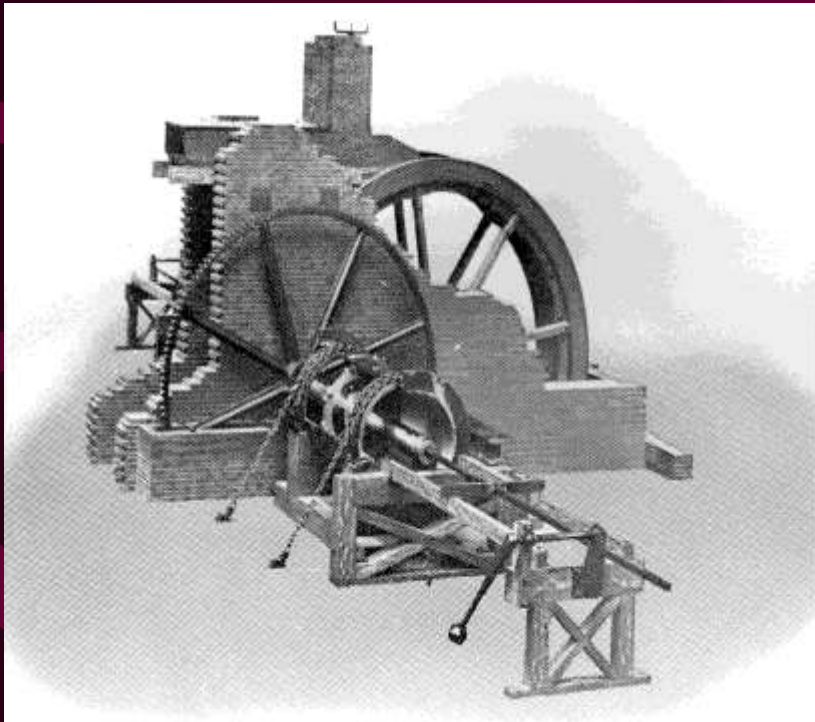
- Humans put handles on tools to increase their muscle power.
- The bow was invented because it throws arrows further than by hand.
- They sharpened ends of sticks to kill animals.

# Copper, Bronze, and Iron Age



- Copper and bronze lead to better tools to find food and shelter.
- It could be hardened by heating and hammering.
- Iron was an improvement over previous tools; it was stronger and tools stayed sharper longer.

# Wilkinson's Boring Mill



- Wilkinson invented the boring mill in 1775.
- Watt's steam engine became a reality.
- As a result other machine tools were developed.
- The Industrial Revolution soon followed.

# The Industrial Revolution



- Started in the 1770s and spread across the world.
- Machines started to replace manual labor.
- England became a world power.
- Industrial Revolution created more jobs.

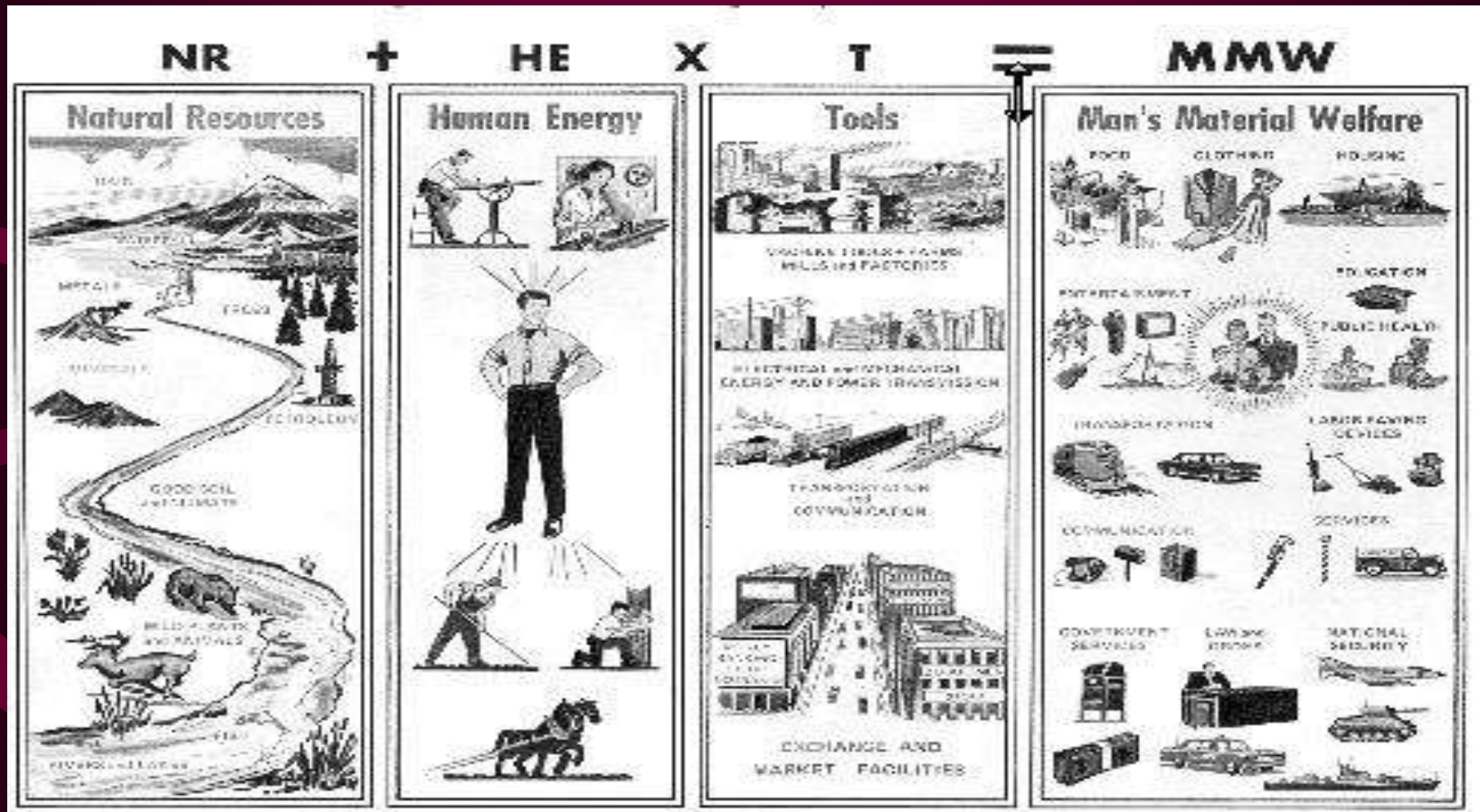
# Hand Tools to Machine Tools

- Hand tools set pattern for machine tools.
- Machine duplicate hand motions better.
- Machine tools produce faster and better goods.
- Machines an extension of the human hand.





# The Law of Production



# Economic Facts

- Everything in the world comes from somewhere.
- Government is never a source of goods.
- Government's only money is that taken first from the people.
- All payroll and employment comes from the customers.
- Customer security comes from worker and management cooperation.

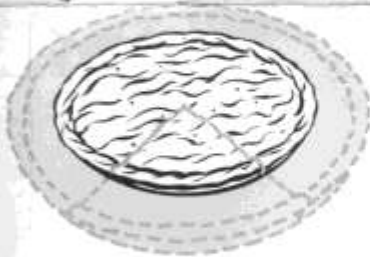
# Economic Facts (cont'd)

- Wages are the principle cost of everything.
- The greatest good for the greatest number.
- All productivity is based on three factors.
- Tools are one of the 3 factors.
- The productivity of tools.

# How Living Improves

## HOW LIVING IMPROVES\*

"The material welfare of people is in direct proportion to what they produce."



*"There is no solution in re-distributing the same pie. That pie must be made bigger."*

"Economic growth depends entirely upon increasing the potential output per man hour."



*"To increase the value of output per man hour, we must invest in better tools and use them efficiently."*

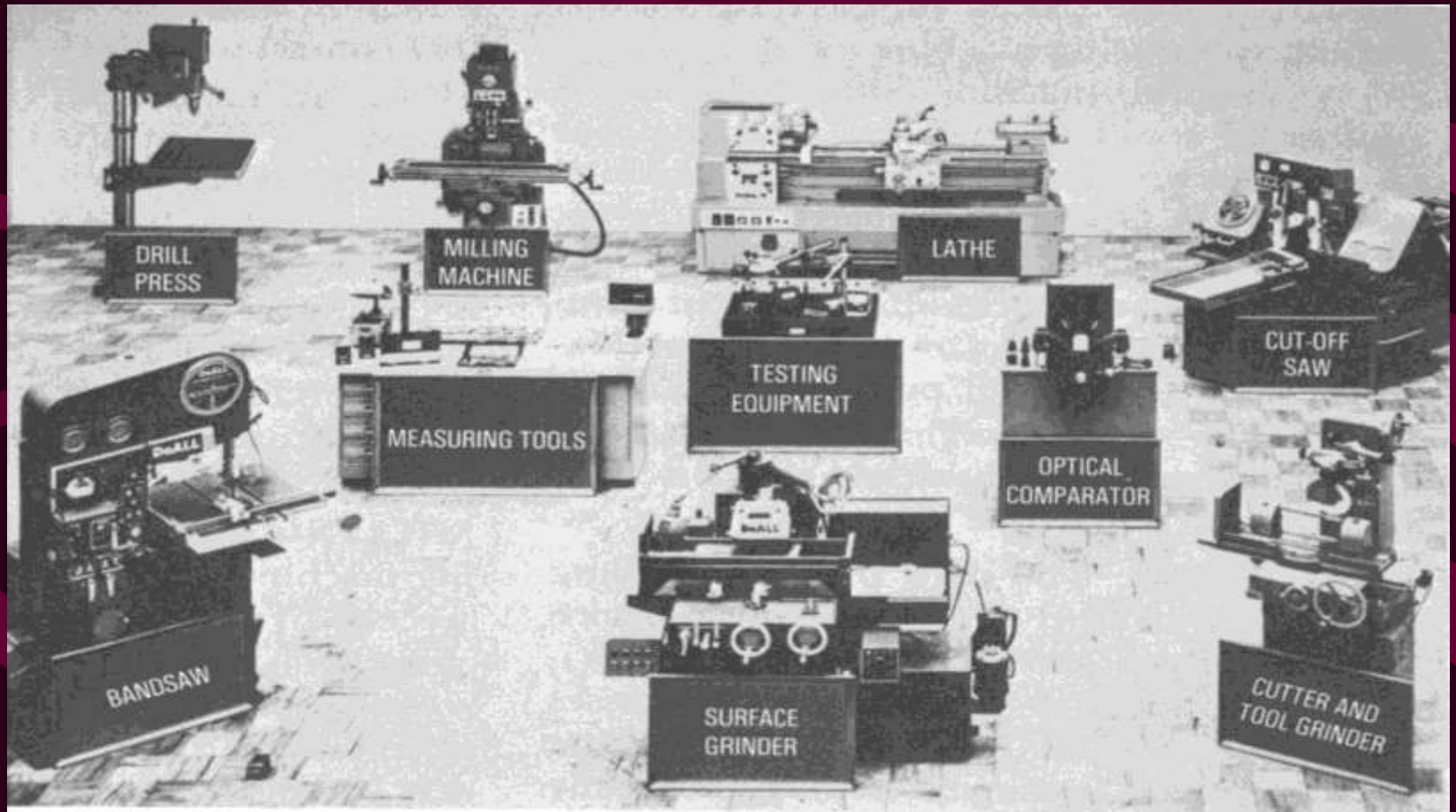
"As productivity increases these 4 factors must balance."



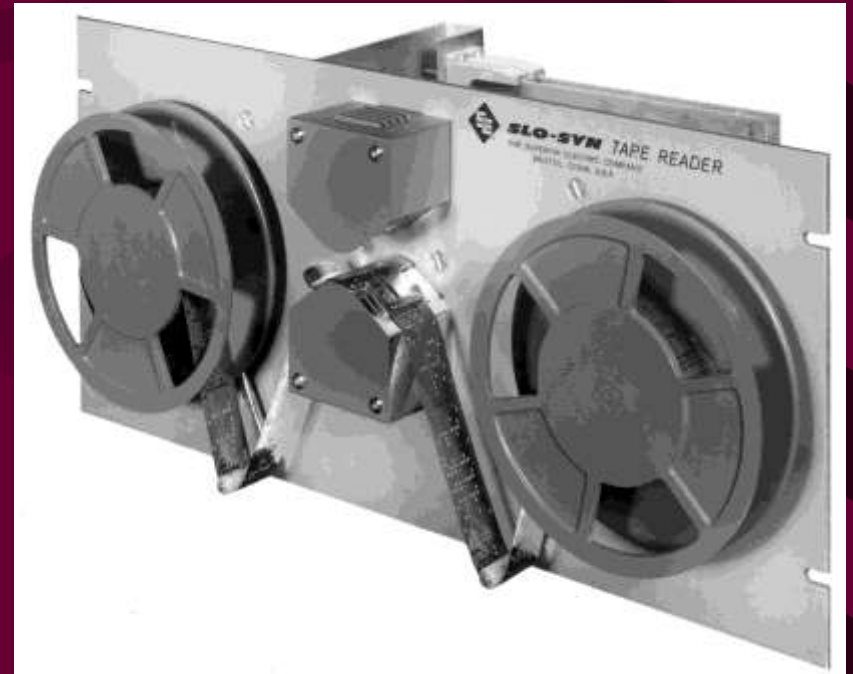
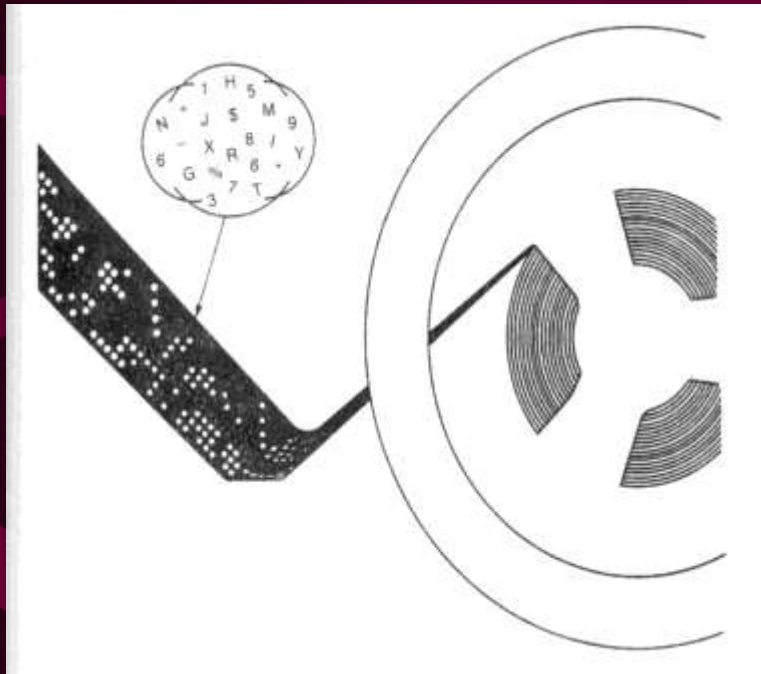
*"In a free economy these four elements keep in balance if not thrown out of balance by government decree or by demands from pressure groups."*

**\*To Achieve the Greatest Good for the Greatest Number of People**

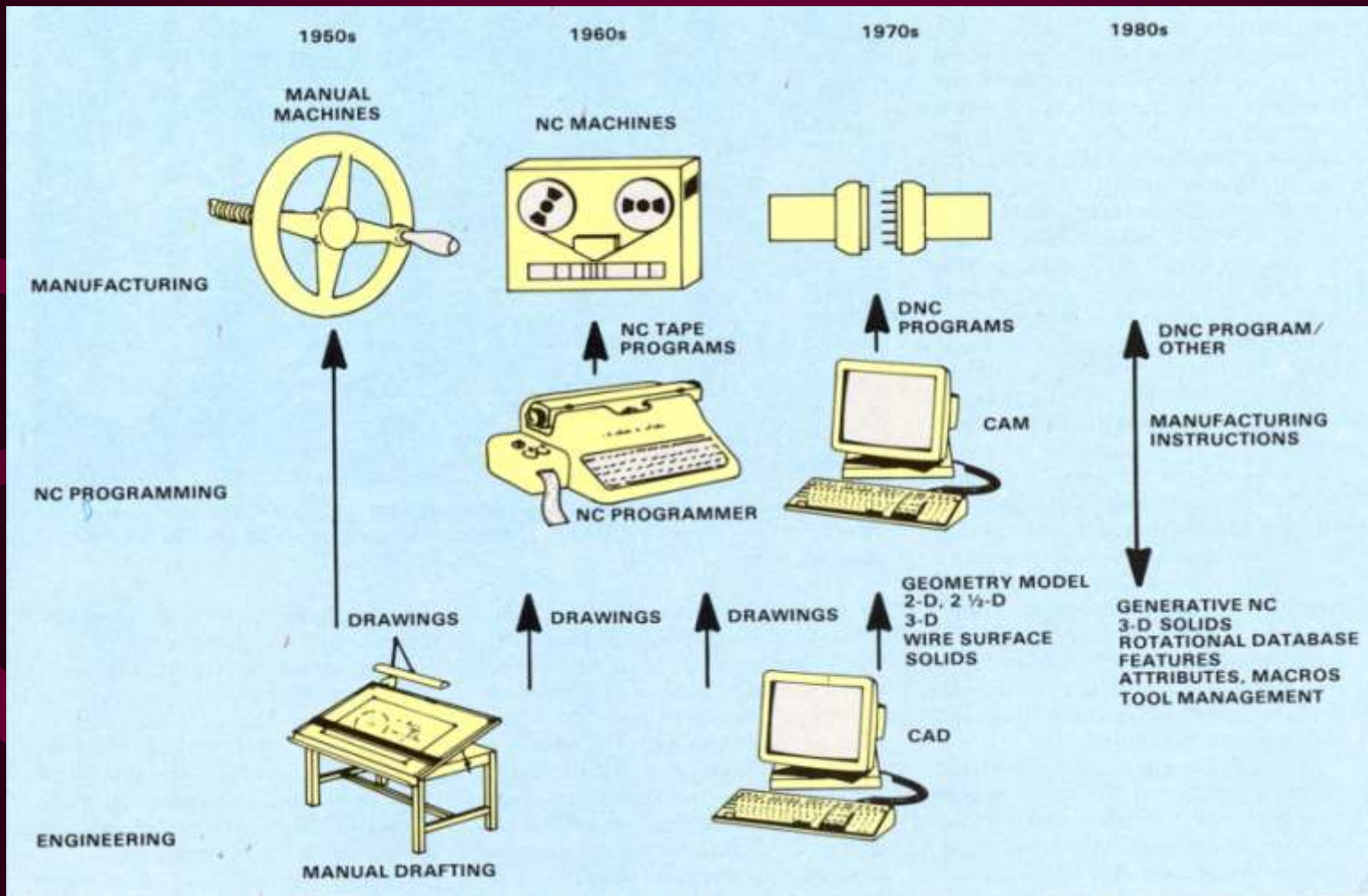
# 20<sup>th</sup> Century Machine Tools



# Computer Age Machining



# CAD/CAM Evolution

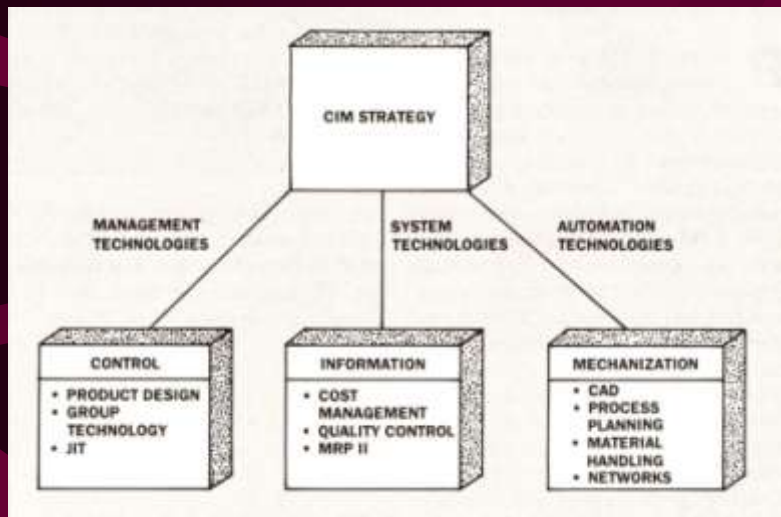


# CAD/CAM Notes

- **CAD** – allows creating design models on a computer screen.
- They can be designed quickly to incorporate the best balance of production and cost.
- Some CAD programs allow a person to see how a part will perform in use.
- **CAM** – creates manufacturing programs using CAD design data.
- It includes tool control, selection, and monitoring of manufacturing systems.
- The program can identify and eliminate manufacturing problems before they happen.

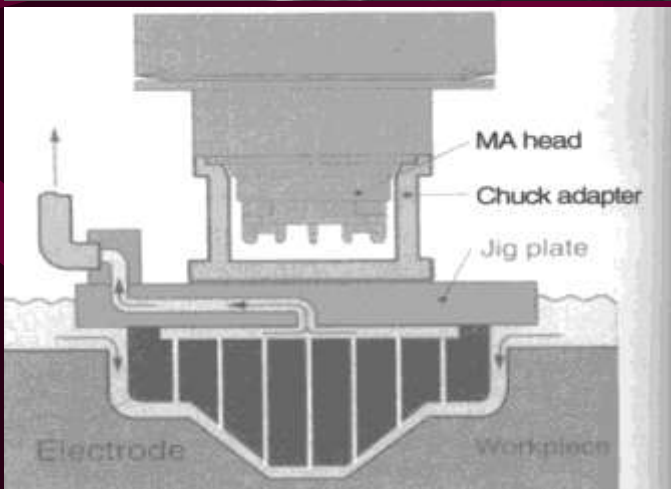


# Computer Integrated Manufacturing



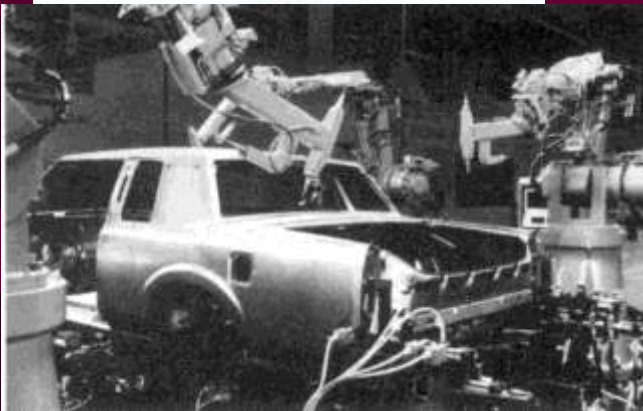
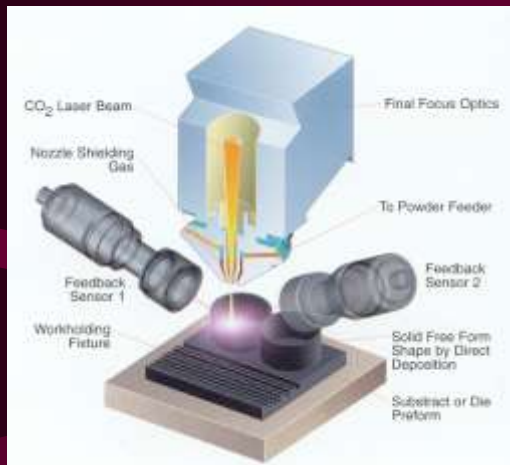
- CIM controls data flow through engineering, mfg., marketing and finance.
- It links CNC, CAD/CAM with data processing such as accounting, inventory control, etc.
- With data flowing freely, the company can operate at maximum efficiency.

# New Generation Machine Tools



- **Laser**, a controlled beam of unified light.
- Used in industries (mfg, communications) to cut, weld, drill, etc.
- **El. Discharge Machining**, a metal-removal process using spark-erosion technology.
- Any electrically-conductive material

# New Generation Tools (cont'd)

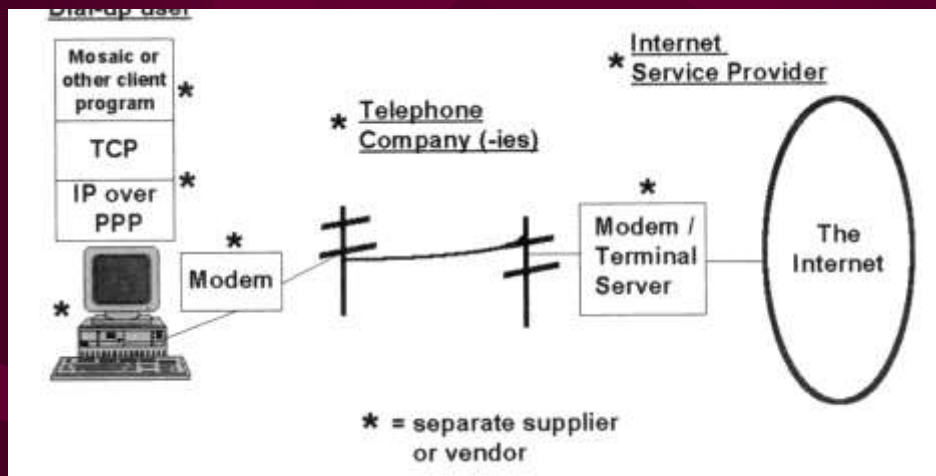


- **DMD**, a process that makes parts from metal powder solidified by laser.
- A blending of 5 technologies.
- **Robots** are programmable, multi-functional tool for moving parts, tools, and perform many tasks.

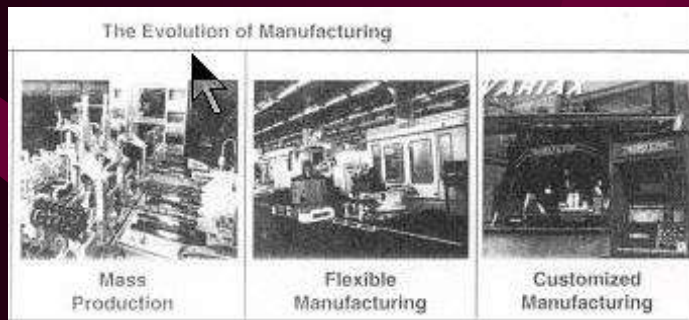
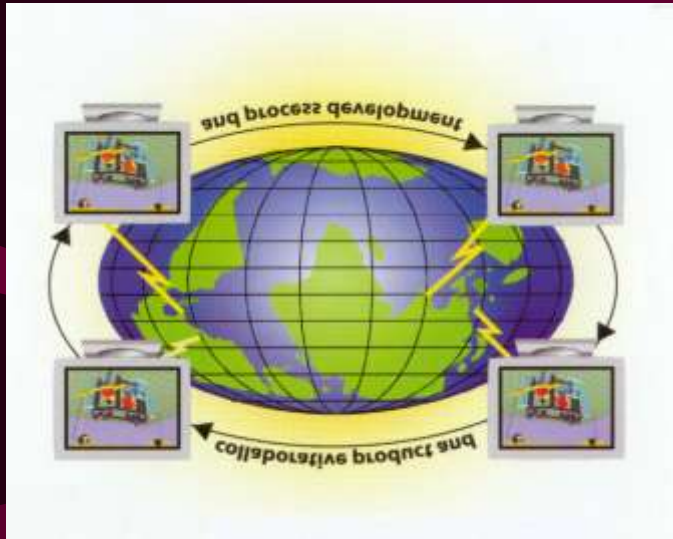
# The Information Age



# The Information Age (cont'd)



# Manufacturing in the Future

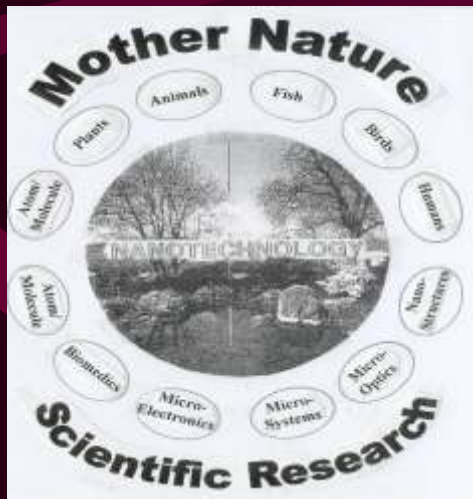


- **E-Mfg.** provides a roadmap for information transfer.
- Internet changed mfg.; it is fast, works well, lowers cost and is productive.
- **Custom Mfg.** Combines mfg. & product technology.
- It is possible to meet customer wishes, fast and cheaply.

# Manufacturing in the Future (cont'd)



- **Virtual Reality** allows to create, see, test a part before it is mfg.
- Replaced costly and long mfg. of prototypes saving time & costs.
- **Nanotechnology**, the science of using atoms & molecules to build parts.
- Molecular mfg.; allows building products with special qualities.



# Manufacturing Matters

- Manufacturing provides high-paying jobs.
- It raises our standard of living.
- It drives productivity.
- It involves many workers.
- Manufacturing workers earn high wages.
- Manufacturing is used in producing other products.



# Contact Information

## For Seminars

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## For Lean Manufacturing

For information, on the Internet go to:

[www.productivitydevelopment.com](http://www.productivitydevelopment.com)

**For information on Adobe Systems: go to**

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