Topics for 09/29/2015 Discussions

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NJTC Management Tools Case Studies

"…If you can't explain it simply, you don't understand it well enough…"

Albert Einstein

"…How can you mean what you say, if you cannot say what you mean…?"

"…Hidden In plain sight…"

"…Known Known's & Known Unknowns…"
By Donald Rumsfeld, Former Secretary of Defense, 2014

"Islands Of Information"
HBR Article 1979

1. **Discovery Process**
    a. Create A Scientific Fact Gathering Base Line from all aspects of the corporate enterprise using Excel
    b. Map The Entire Corporate Enterprise using Excel
    c. Organization Charts using Power Point
    d. Board Level, C Level, CEO, CFO, CIO, CTO, COO, Legal, Audit & Compliance, using Power Point
    e. Organizational Legacy Structure Stove Pipes Break Outs using Power Point
    f. DFW's-Data Flow Diagrams using Power Point
    g. Functional Flow Charts using Visio
    h. WBS-Work Breakdown Structures
    i. Clusters
    j. Bottlenecks
    k. Historical Statistical Trend Analysis
    l. MTBF
    m. MTTR
    n. QC Issues
    o. Documenting Historical Failure Rates
    p. Utilize Box Jenkins Statistical Historical Failure Rates (of 7+ years) to Forecast
        i. Big Data
        ii. Statistical Analysis
        iii. Failure Rates with a 95.0% Level of Confidence
        iv. Scheduled Maintenance
        v. Seasonal Trends
        vi. Seasonality
        vii. MTBF
        viii. MTTR
        ix. Of Mission Critical Spare Parts which feeds into the JIT-Green Supply Chains
        x. Cost Accounting

xi. **Implement a formalized RE-Insurance program to Financially Off-Set These Forecasted Statistical Losses**
xii. Against which we can conduct Cost Benefit Analysis of multiple types of proposed solutions
xiii. Price out, conduct Cost Benefit Analysis of Proposed Programs moving Forward
xiv. Measure Programs Progress to date
xv. Document Cost Benefit Analysis, Program Progress at end of program
xvi. PMO Post Mortem
xvii. Based on Discovery Phase Conduct Cost Benefit Analysis on Lessons, Learned, Cost Avoidance, Implemented, New Technologies Efficiencies implemented

2. **MS. Office**
   a. Word- Reporting
   b. Excel Spread Sheets-Budgets, Financial Analysis, Gap Analysis
   c. MS Project PMO Program Management
   d. PowerPoint-Presentations
   e. Visio for WBS-Work Break Down Structures, Flow Charting, Documenting of both Current, Proposed Operational Structures.

3. **Sniffer SW Tool to ID HW on SNA**
   a. HW Inventory Control
   b. Spare Parts
   c. MF, Computers
   d. PC's
   e. Printers
   f. Routers
   g. Hubs
   h. Servers
   i. Communications Cabinets
   j. RS-232 HW
   k. Hand Held devices
   l. Tablets
   m. I Phones
   n. Big Data
   o. Statistical Analysis
   p. Inventory Control
   q. Asset Management
   r. Cost Accounting
   s. Tax Deductions Appreciation

4. **SW Licensing Inventory Control, Asset Management, Coast Accounting, Legal, Audit & Compliance Risks, ID & Manage Liability Risks**
   a. Formally Documented Corporate Wide SW Licensing Policies ID SW Licensing Risks, Mitigate SW Licensing Risks before they develop
   b. SW Inventory Control
   c. Asset Management
   d. Coast Accounting
   e. Country-Country Code
   f. Department, State Code
   g. City Code
   h. Zip-Code

i. CC-Cost Center
j. ID SW License Number
k. Legal VS Unlicensed Copies, Grey Market
l. Big Data
m. Statistical Analysis
n. Inventory Control
o. Asset Management
p. Cost Accounting
q. Tax Deductions Appreciation

5. **IBM WATSON ANALYTICS**
   - **a.** Watson Analytics is an analytics service
   - **b.** That lets you discover patterns and meaning in your data—from the cloud.
   - **c.** It offers
     - **i.** guided data exploration,
     - **ii.** automated predictive analytics and
     - **iii.** enables effortless dashboard and infographic creation
   - **d. Predictive Statistical Analytics**

6. **Discovery Phase**
   - **a. Survey document The Corporate Enterprise Legacy Systems**
   - **b. Document The Industry**
   - **c. Survey document the Competition**
   - d. Big Data
   - e. Statistical Analysis
   - f. Inventory Control
   - g. Asset Management
   - h. Cost Accounting
   - i. Tax Deductions Appreciation
   - j. QC
   - k. Rejection Rates
   - l. Failure Rates
   - m. Return Item Rates
   - n. MTBF
   - o. MTTR
   - p. Forecasting
   - q. Line Balancing
   - r. Global Competitive Analysis
   - s. National Competitive Analysis
   - t. Regional Competitive Rates by Zip-Code Analysis

7. **Know Thy Customer**, Customer Care
   - a. Statistical Analysis
   - b. Demographics
   - c. Competitive Analysis
   - d. Market Place
   - e. Statistical Percentage of Market Share
   - f. Statistical Percentage of Market Share belonging to competitors
   - g. Statistical Percentage of Market Share
   - h. Zip-Code Analysis
   - i. Household Collapses

j. USD$ Actual Costs to Control each percentage of Market Share

8. **Big Data RDBMS for**
    a. Cyber Security
    b. Electronic Warfare
    c. Statistical Analysis
    d. The Books of the Corporate Enterprise
    e. Records Retention, Compliance Tools, Rules
    f. ID Contractually Lease Space at Off-Site Redundant Data Centers, Call Centers
    g. ECRM
    h. CIF
    i. Profiling
    j. Demographics
    k. Data Mining
    l. Zip-Code Analysis
    m. Household Collapses
    n. Box Jenkins 7+ years of Statistics Research generates a 95% level of confidence Forecasting
    o. Line Balancing
    p. MTBF
    q. MTTR

Real-Time Analytics: Techniques to Analyze and Visualize Streaming Data Kindle Edition

by Byron Ellis (Author

- **Construct a robust end-to-end solution for analyzing and visualizing streaming data**
- Real-time analytics is the hottest topic in data analytics today.
- In *Real-Time Analytics: Techniques to Analyze and Visualize Streaming Data*, expert Byron Ellis teaches data analysts technologies to build an effective real-time analytics platform.
- This platform can then be used to make sense of the constantly changing data that is beginning to outpace traditional batch-based analysis platforms.

The author is among a very few leading experts in the field. He has a prestigious background in research, development, analytics, real-time visualization, and Big Data streaming and is uniquely qualified to help you explore this revolutionary field.

Moving from a description of the overall analytic architecture of real-time analytics to using specific tools to obtain targeted results, *Real-Time Analytics* leverages open source and modern commercial tools to construct robust, efficient systems that can provide real-time analysis in a cost-effective manner. The book includes:

- A deep discussion of streaming data systems and architectures
- Instructions for analyzing, storing, and delivering streaming data
- Tips on aggregating data and working with sets
- Information on data warehousing options and techniques

Real-Time Analytics includes in-depth case studies for website analytics, Big Data, visualizing streaming and mobile data, and mining and visualizing operational data flows. The book's "recipe" layout lets readers quickly learn and implement different techniques. All of the code examples presented in the book, along with their related data sets, are available on the companion website.

A COMPLETE SOLUTION FOR DYNAMIC ANALYSIS OF STREAMING DATA

Real-Time Analytics provides a complete end-to-end solution for cost-effective analysis and visualization of streaming data.

Beginning with a description of the required analytics ecosystem, the book builds upon that foundation with practical guidance toward the tools and techniques that get targeted results.

Outlining best practices for each specific application throughout the discovery life cycle, the approach provides easy-to-follow instructions for implementing the presented tools and techniques.

Examples taken from real-world applications highlight the usage of various aspects of data processing from tabulation to visualization and forecasting. Readers will:

- Understand the components of streaming data systems, including their full capabilities and characteristics
- Learn the relevant architecture and best practices for analysis and storage of streaming data
- Develop a system for data aggregation, delivery, and warehousing using open source and commercial tools
- Learn the implementation and application of advanced algorithms and data structures to streaming applications

Decreasing data acquisition costs and increasing connectivity are enabling ever more efficient methods of continuous collection, so why do analysis platforms remain largely batch-based?

The tools do exist to efficiently handle streaming data analysis and visualization feasibly in terms of time, maintenance and hardware.

This book guides readers through the construction of a robust, cost-efficient system with clear, expert instruction.

About the Author

BYRON ELLIS is CTO of Spongecell, where he heads research and development. Previously the Chief Data Scientist for LivePerson and CTO at AdBrite, Ellis holds a Ph.D. in Statistics from Harvard University, and a B.S. in Cybernetics from UCLA. He presents sessions on real-time analytics at Strata and other major conferences.

9. **SNA-Fault Tolerant Architecture of 'HW & SW**
    a. Statistical Analysis
    b. Redundant Architecture
    c. Stratus HW
    d. Solid State Hard Drives
    e. MTBF
    f. MTTR

g. Forecasting JIT replacement of mission critical spare parts
h. Real Time Monitoring of Mission Critical Components automatic reordering of failure rates of mission critical components
i. Systems Self-Diagnostics of longevity, operational lifetime of mission critical spare parts based on the Total Number of Hours Life Time and Forecasted Failure Rates
j. Automatically reorder mission crititical spare parts in anticipation of failures
k. NYC/MTA/TBTA EZ-Pass Toll Registry Program Fault Tolerant Non-Stop SNA HW/SW Network Design
l. Recommended for
    i. PSE-Pacific Stock Exchange
    ii. Fokker Aircraft CAAV Vietnam
    iii. ATT/Bell Core International Call Centers
    iv. DOD/USN/NAVSEA
    v. LMC, LLC. McKinney, Texas
    vi. JPMC Oracle LDW Corporate Transformation
    vii. ISH Bankie, Istanbul, Turkie
    viii. Wexford Medical Systems The Medic
    ix. Angolan Stock Exchange
    x. Angolan Commodities Exchange

10. Statistical Analysis

a. Big data
b. Statistics
c. Cost Accounting
d. Asset Management
e. Budgetary Forecasts
f. Tax Depreciation Allowances
g. Regression Analysis
h. Historical Data Collection
i. QC Rates
j. Failure Rates
k. Reject Rates
l. Return Rates
m. P&L
n. ECRM,
o. Data Mining,
p. Demographics,
q. Zip-Code Analysis,
r. Household Collapses
s. Determining Trend Analysis
t. Forecasting Trend Analysis

11. MTBF-Mean Time Between Failure

a. Are the Enterprise Systems, SNA, Networks Physically Redundant
b. Discovery Historical Analysis of Historical Failure Rates by
    i. Division, Operating Center, Cost Center
    ii. Country State, Department, City Factory. Building, Floor, CC Number
c. Establish a real means to ID, monitor, documentation, record records of Historical Failure Rates
d. Answer Passive Electronic Sensors for real time monitoring of all mission critical components

e. Statistical Analytic determination of all mission critical interrelated components that the Enterprise IT, Telephony, Engineering, Maintenance need to have in stock in order to repair, triage in the field the failure of mission critical components
f. Closed Loop Statistical Feedback to Big Data
g. JIT-Green Supply Chains upgrading statistical failure rates by Date, Time, Zip-Code, Building, Floor Number, Cost Center, HW Number
h. Cost Accounting
i. Asset Management
j. Budgetary Forecasts
k. Regression Analysis
l. IT/Telephony Systems
    i. SNA-Fiber Backbone Campus Architecture
    ii. CAT-5 Cabling
    iii. Communication Cabinets
    iv. UPS Power Systems
    v. Firewalls
m. Data Elements
n. HW
    i. HW
    ii. Solid State Drives
    iii. PC's
    iv. Printers
    v. HP-Plotters
    vi. 3-D Printers
    vii. Servers,
    viii. Routers,
    ix. Hubs,
    x. Communication Cabinets
    xi. UPS HW
    xii. SNA Fiber Backbone,
    xiii. CAT-5 Cabling
    xiv. Firewalls

12. MTTR-Mean Time To Repair

a. Statistical determination of the actual required times to repair, replace, correct all mission critical interrelated components that have failed, in order to insure continuity of day to day operations
b. Regression Analysis
c. Staffing Levels
d. Skill sets

13. SW.

a. Cyber Security
b. Electronic Warfare
c. Data Breaches
d. Data Privacy
e. Statistics
f. Big Data Inventory Control of all SW Licenses
g. Audit, Compliance, Contracts, Procurement, Legal
h. Insuring that Enterprise Wide SW Licenses Numbers are legitimate and up to date, eliminating Legal, Financial Risks to the Corporate Enterprise

i. Firewalls Security
j. Defensive SNA HW/SW Architecture Designed to thwart 24 x 7 Hacking Attacks
k. Sniffer designed to monitor Entire Enterprise Architecture SW
l. Fire Walls

14. Hardware

a. Cyber Security
b. Electronic Warfare
c. Statistics
d. Big Data Inventory Control of all SW Licenses
e. Identified via
f. ISO-Series, Manufacturers Specifications, IT, Operations, Engineering
g. Enterprise History of Frequencies, Dates, Times, Zip-Code Locations, HW Serial Numbers of Failures of Mission Critical Components
h. Statistical Recording of Historical Standards of Mission Critical Failure Rates
i. Gap Analysis, Variance Analysis of Industry Standards of Mission Critical Failure Rates

15. Manufacturing

a. Cyber Security
b. Electronic Warfare
c. Manufacturing Assembly Lines
d. 24 x 7 Smart Factory Floor Robotics
e. MTBF
f. MTTR
g. QC Issues
h. Industrial Cleanliness, Built In, Integrated Industrial Vacuums removing, 99% of resulting Metal Shavings, Dust, Contaminants
i. Noise Abatement
j. Meeting Federal Manufacturing Standards
k. Meeting ISO Standards, Guidelines
l. Current Automotive Industry Failure Rates of Air Bags sensors
m. 100% of Global air bag sensors are made by only 1 Mfg in Japan
n. US Ethical Drug Manufacturing has migrated overseas for less liability however US Medical Model is severely dependent upon Foreign QC medical manufacturing Standards and Green JIT-Supply Chain of Normal Drugs and Emergency Drugs

16. Risk Management

a. Risk ID
    i. Statistical Analysis Identifying, Documenting the actual types of Risks Identified,
    ii. Statistical Forecasting
    iii. Risk Resolutions,
    iv. JIT-Green Supply Chains,
    v. Logistics
    vi. Asset Management
    vii. Coast Accounting
    viii. LIFO v FIFO
b. Risk Resolution
c. Risk Mitigation
    i. Statistical Analysis Identifying, Documenting the actual types of Risks Identified, to be remediated, repaired
    ii.

d. Risk Modeling

17. **Chaos Theory**
    a. **Genesis, "…Making Order Out of Chaos…"**
    b. **HBR Article on, "…Islands of Information…"**
    c. **HJ Richardson, SVP Chemical Bank International Interview question December 1977, "…Can you make order out of chaos…"?**
    d. **"…Known Known's & Known Unknowns…" Donald Rumsfeld**
    e. **Cyber Security**
    f. **Cyber Criminals**
    g. **Data Breaches**
    h. **Data Privacy**
    i. **Electronic Warfare**
    j. **Statistical Analysis**
    k. **Big Data**

18. **Change Management**
    a. **Establish Formal Enterprise Wide Procedures**

19. **Change Control**
    a. **Establish Formal Enterprise Wide Procedures**

20. **Forecasting**
    a. Statistical Analysis
    b. Big Data
    c. Box Jenkins 7+ years of Statistics Research generates a 95% level of confidence Forecasting
    d. Box Jenkins 7+ years of Statistics Research generates a 95% level of confidence Forecasting
    e. Anticipating specific types of failures by Date, Geographic Locations, Country Code, State/Department, City, Zip-Code, Household Collapses, Building, Floor, Type of HW, SW, Operational Component, Bar Code Numbers

21. **JIT-Green Supply Chain**,
    a. Statistical Analysis
    b. Big Data
    c. MTBF
    d. MTTR
    e. Forecasting Resupply of Mission Critical Spare Parts
    f. Line balancing
    g. Lean Logistics Analysis derived by Statistically Discovery, Data Collection,
    h. One Japanese city has a global monopoly on the manufactures of 100% of all Automotive Air Bag Sensors for the air bag sensor Global Supply Chain

Case Study Examples

22. **Computer Hacking, Cyber Security,**
    Spam, Trojan Horse, Phishing,
    Data Breach, Data Security & Data Privacy
    a. **Cyber Criminals steal USD$1.0 B PA from small & medium sized businesses**

b. **72% of American business that suffer major data losses from Data Breaches are liable to law suits and shut down within 24 months**
c. **Firewalls**
d. **Anti-Malware**
e. **US FCC is currently seeking to have its legal authority powers expanded to regulate, address private practices of Edge Providers, Data Breaches, Data Privacy Cases, Phishing against small and medium sized businesses**
f. **Foreign Government State Actors**
    i. **PRC**
    ii. **North Korea**
    iii. **FSU**
    iv. **Syria**
    v. **Iran**
    vi. **India**
g. **Rogue Private Sectors Actors**
    i. **Eastern Europe**
    ii. **FSU**
    iii. **PRC**
    iv. **North Korea**
    v. **Iran**
    vi. **Iraq**
    vii. **Lebanon**
    viii. **Syria**
    ix. **India**
    x. **Central America**
    xi. **Latin America**

23. Cyber Attacks, Cyber Theft, Hacking

a. Intellectual Property
b. SONY
c. Stock Markets
d. Banks
e. DOD
f. Pentagon
g. Homeland Security
h. FBI
i. CIA
j. US Federal Gov't Personnel Records
k. US Defense Contractors
l. Snowden, Wiki Leaks
m. Private Contractors

24. Cyber Security

a. Big Date
b. Statistics
c. Public Sectors
d. Private Sectors
e. Public & Private Sectors JV Integration
f. JV R&D Integration Silicone Valley & Federal Gov't Redstone, DOD, NSA, CIA, FBI, ONI, Dept Homeland Security, US Treasury, US State Dept, DOJ, Space command, FAA, ICE, FEMA,

g. Offensive Strategies
h. Defensive Strategies

25. US Power Grid 100+ year Legacy Infrastructure is Painfully Vulnerable to both internal and foreign Cyber Attacks

a. While the US Power Grid is a “dumb grid” and not “smart grid” to anticipate and manage in real time, offset the Risks of Roll Over’s
b. The US Grid is still vulnerable to Covert Offensive Destabilizing Hacking designed “decapitate” cripple, blind the US Defense Establishment, Intelligence, Finance,

26. Electronic Warfare

a. Big data
b. Statistics
c. Statistical Analysis
d. Regression Analysis
e. Public Sectors
f. Private Sectors
g. Public & Private Sectors JV Integration
h. JV R&D Integration Silicone Valley & Federal Gov’t Redstone, DOD, NSA, CIA, FBI, ONI, Dept Homeland Security, US Treasury, US State Dept, DOJ, Space command, FAA, ICE, FEMA,
i. Offensive Strategies
j. Defensive Strategies
k. Firewalls
l. Secure Routers
m. Anti-Malware SW
n. Anti-Phishing
o. Trojan Horses
p. Worms

27. **Transportation Case Study Examples**

a. Fleet Management Cars, Trucks, Airlines, Ships, RR scheduled maintenance mandated by
b. ICC,
c. DOT,
d. NRA,
e. FAA,

28. Highway Commissions, Bridges, Tunnels Schoharie, CT Bridge Collapse 1988

a. After the disastrous collapse of the Schoharie Bridge in Connecticut, 1988 Audits revealed that there were no formal mandated Bridge & Tunnel Federal legislation on the books for Bridge & Tunnel Inspections, scheduled maintenance inspection cycles and proposed structural repairs
b. Congress passed The Schoharie Bridge & Tunnel Legislation scheduling a 1 day to 20+ year Federally mandated Bridge & Tunnel Inspection Cycles
c. Smart Bridges, Tunnels utilize sensors for real time monitoring of the physical integrity of Bridges & Tunnels infrastructure measuring structural steel, concrete restivity to
d. harmonics, restivity, variant temperate ranging from -35 F to 150+ F, wind shear factors, rain, ice, hale, snow,
e. natural subterranean Harmonic, tremors

29. **According to US ICC, Federal DOT 2015, there are approximately**
    a. 4,500-5,000 bridges of all size that need major repairs or total replacement in the USA today
    b. Design Bridges, Tunnels with long term weather resistant, utilizing hi-tinsel strength materials, designed to last for decades, wind shear factors, -35 degrees to 150+ degrees and require as little maintenance as possible
    c. Utilization of heavy industrial PVC electrical tray conduits, water drain pipes, water collection conduits, water collection basins which will absolutely never rust or rot out at all over their estimated life time from oxidation and DOT's heavy uses of salts, calcium spreads to melt snows, ice on roads, bridges and tunnels.

30. **BN-Burlington Northern RR Federal 1934 NRA Act 1974-1976**
    a. BN Board requested a Cost Benefit Analysis for Locomotive Utilization
    b. Buy A Complete New Fleet of GE 5,000 HP Diesel/Electric Locomotives @USD$500,000. Per unit
    c. vs. Contract for same number of GE 5,000 HP Diesel/Electric Locomotives, under an extended procurement cycle
    d. By Developing an Extended Life Cycles via Statistical Analysis if Scheduled Maintenance, Repairs, JIT
    e. A RR Consist of 100 railroad cars, Box Cars, Gondola Cars which are pulled by 5 in tandem diesel electric locomotives
    f. USD$25.0 M State of The Art Round House installed in at themed-Point between Minot, ND Equal-Distance between Chicago, Ill & Seattle Washington Piers for Export to Asian Basin
    g. 80%-90% of the Diesel/Electric Locomotive Break downs occurred on the East Slope of th Rocky Mountains at a series of very steep inclines which caused the truck housing bearings to burn out"
    h. BN should have statistically, historically analyzed where the greatest number of diesel/electric locomotive break downs occurred by type of incident to strategically determine where BN should build the USD$25.0 M Round House, so that the repair facilities would be right in front of where the historical breakdowns occurred
    i. Recommended that BN in its JIT-Logistics of spare parts contract negotiations with 100% of their spare parts suppliers demand that GE, the vendors, suppliers, physically bar coded each case, crate of supplies being received by BN warehouse staff so tha the BN warehouse staff could work more efficiently, bar code read all incoming all receivable boxes, crates being received from all BN vendors, suppliers such as GE
    j. This vendor supplied Bar-Code Scheme generated massive savings in the BN Warehouse Inventory Staff's 24 x 7 "Pick, Pull Of BN's Spare Parts" from crates, shelves
    k. **Bar Coding** use of Bar-Code readers are the key to a successful, efficient, profitable JIT-Green Supply Chains of Mission Critical Spare Parts designed to keep the BN fleet running at 98% efficiency and on time deliveries, earning greater profits on Red Flag Express Trains running from Chicago, Ill, Minneapolis/St. Paul Minnesota
    l. Under detente the US & USSR negotiated high grain export deals in light of USSR's cyclical grain failures
    m. BN had the contract from major US Grain Firms on the Great Lakes to sell, export surplus US Grains to USSR transporting it by BN RR from Great Lakes Grain Storage Silos to New Orleans for export by sea on US Ships to Italy for transfer to Soviet ships for final transport to Odessa, USSR on the Black Sea
    n. Grains are normally transported in covered, enclosed gondola cars

o. BN ran out of enclosed grain gondola cars reverting to transporting grains in open gondola RR cars with roofs nor tarpaulin covers thus loosing 30% of the total grains cargo tonnage between Great Lakes, St.Paul Minnesota, and New Orleans before export to Italy and USSR

31. **Fleet Sale of Fokker Aircraft to CAAV Gov't Hanoi, Vietnam 1990-1994**
    a. **F-50's to CAAV-Civilian Aviation Agency Vietnam** Gov't of Vietnam
    b. Knowledge Transfer of Fokker, US FAA Regulations, Compliance, JIT-Logistics Spare Parts via
    c. Taiwanese Trained certified by US FAA
    d. Formalized Risk Management, Change Management Cycles
    e. Scheduled Maintenance Inspection Cycles with required repairs, parts changes
    f. JIT-Green Supply Chains of Mission Critical Spare Parts

32. The Days They Changed the Gauge

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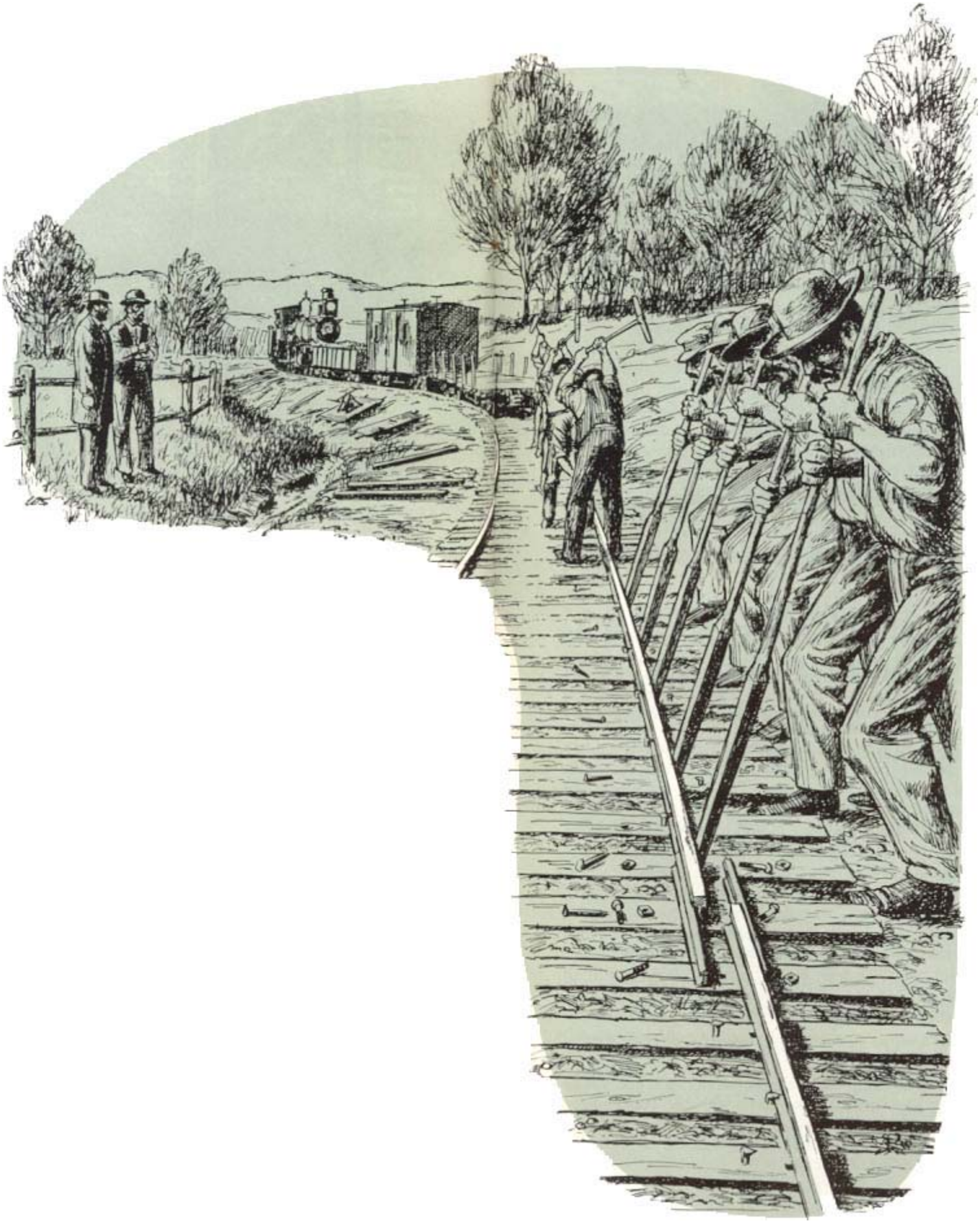

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May, 1886. President Grover Cleveland was making final preparations for his wedding. Jefferson Davis, in a rare public appearance, was drawing large and enthusiastic crowds of admirers. Throughout the nation, final preparations were being made for the celebration of Memorial Day.

And in the South, plans were nearing completion for one of the most complex and dramatic two-day periods in railroading history-changing the gauge of an estimated 11,500 miles of track.

It was a little over a half-century since the South Carolina Canal and Rail Road Company had inaugurated steam-powered freight and passenger travel on a regularly-scheduled basis.

Horatio Allen, the railroad's chief engineer,

- **had departed from the 4-foot 81/2-inch gauge used in England**
- **by prescribing a 5-foot gauge and in the years that followed,**
- **most of the South's railroads copied his example.**
- **But in the North, the British example was dominant.**
- **It made little difference in the years preceding the War Between the States,**
- **since the two regions exchanged few goods requiring rail transportation.**
- **But as the South began its recovery from the war,**
- **it became readily apparent that complete economic reconstruction**
- **would require easy commerce with the rest of the nation-an impossibility**
- **so long as differences in gauge existed.**

At first, the problem of interchange had been temporarily relieved

- **by laboriously loading freight from one car to another**
- **at interchange points between railroads of different gauges.**
- **But the growing trade between the South and the rest of the nation**
- **soon required faster and less costly methods.**
- **A crude form of containerization was devised, with freight remaining in the same car throughout the journey-**
- **with the wheel trucks being changed at interchange points as necessary.**
- **Soon, as a contemporary writer pointed out, "not a prominent point could be found on the border without its 'hoist' and acres of extra trucks."**

Variety in gauge size wasn't uniquely a difference, between North and South.

- **In 1871 no less than 23 different gauges existed in the United States,**
- **ranging in width from**
- **three to six feet.**

Within the South,

- **the state of North Carolina prescribed by law a gauge of 4 feet 8 1/2 inches to encourage a traffic flow to its own ports,**
- **rather than those in Virginia or**
- **South Carolina**

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- **(each of which were primarily served by rails spaced five feet apart).**
- **Goods going between Virginia and South Carolina**
- **had to go through at least two interchanges on the way.**

It was clearly a condition that could not continue.

In 1884 the Illinois Central-which operated in both regions-

- **found it necessary to begin changing the gauge of its lines in the South to conform with the northern width.**
- **The need to compete soon forced the Mobile and Ohio to change-**
- **putting direct pressure upon the Louisville and Nashville and the Cincinnati Southern**
- **to match the improved service of their competitors.**

In effect, the

- **pressures of free competition**
- **had provided a catalyst,**
- **and the stage was set for changing the gauge of practically every road in the South-a change that, ultimately,**
- **would be accomplished in less than 36 hours.**

February 2-3, 1886, marked the first step. As agreed the previous October at a meeting of the Southern Time Convention, operating officers of the South's railroads met at the Kimball House in Atlanta

- **in a "Convention ...called for the purpose of fixing date and arranging details for change of gauge."**

Made at the Chattanooga shops of the Alabama Great Southern Railway, a predecessor of Southern, the level board (top) and track gauge pictured here

- **were used by Superintendent Dan McLarn**
- **to standardize all level boards and track gauges**
- **used during and after the AGS' changing of the gauge on May 30, 1886.**

E. B. Thomas, general manager of Southern's predecessor, the Richmond & Danville, served as chairman of the committee charged with determining the date of the gauge change.

On the Convention's first day he reported:

- **"That Monday, May 31st, and Tuesday, June Ist be designated as the days for general change of gauge. ...Lateral lines may change exterior or subsequent to the dates named by arrangement with connections." .**

On the members of three Convention committees

- **Transportation,**
- **Roadway and**
- **Machinery-**
- **fell the burden of planning for the tremendous task just four months away.**
- **All motive power and rolling stock would have to be removed from the affected tracks,**
- **wheel spacing would have to be adjusted**
- **to fit the new gauge, and**
- **logistics for feeding and equipping**
- **a virtual army of workers**
- **would have to be carried out with military precision.**

But the most important decision of all involved the exact width of the new gauge.

Although the nation largely

- **had adopted the 4-foot 8 1/2-inch width,**
- **the Pennsylvania Railroad-with which many of the South's roads required an interchange-used a 4-foot 9-inch gauge.**
- **For this reason, and owing to minor engineering difficulties encountered by the 4-foot 8 1/2 -inch width,**
- **the Convention had voted to adopt the Pennsylvania gauge as its standard.**

One farsighted man rose on the Convention's second day to ask that the gauge-size decision be reconsidered.

He was John C. Gault, general manager of the

Cincinnati, New Orleans & Texas Pacific, and he made some persuasive arguments: , .

"I deem it of greatest consequence

- **that the standard gauge of the country could be adopted by the Southern Roads. ...**
- **This is the first opportunity that the Southern roads have had to correct**
- **the unfortunate mistake made when the five foot gauge was adopted,**
- **and in correcting it we should take such action as will result in solving the question for all time.**
- **I insist upon saying "to this Convention that the adoption of a 4 ft. 9 in. gauge is only a partial correction of the mistake. ..."**
- **Nonetheless, the Convention chose to go ahead with a standard gauge of 4 feet 9 inches.**

With the Convention's end, four months of intense activity began.

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Differing in some specifics between the various roads,

- **plans were worked out in minute detail**
- **for reducing the width between rails, and between the wheels,**
- **by 3 inches.**

Only one rail would be moved in on the day of the change,

- **so inside spikes were hammered into place**
- **at the new gauge width**
- **well in advance of the change,**
- **leaving only the need for a few blows of the sledgehammer once the rail was placed. As May 31 drew near,**
- **some spikes were pulled from the rail that was to be moved**
- **in order to reduce as much as possible**
- **the time required to release the rail from its old position.**

Rolling stock, too, was being prepared for rapid conversion.

- **Contemporary accounts indicate that dish shaped wheels were provided on new locomotives**
- **so that on the day of the change,**
- **reversing the position of the wheel on the axle**
- **would make the locomotive conform to the new gauge.**
- **On some equipment, axles were machined to the new gauge**
- **and a special ring positioned inside the wheel**
- **to hold it to the 5-foot width until the day of the gauge change.**
- **Then the wheel was pulled,**
- **the ring removed, and**
- **the wheel replaced.**
- **To shorten the axles of rolling stock and motive power that could not be prepared in advance,**
- **lathes and crews were stationed at various points throughout the South**
- **to accomplish the work concurrently**
- **with the change in track gauge.**

A few days before May 31,

- **all roads began clearing cars from their lines and**
- **reducing the gauge of all areas of track that could be freed of cars and engines.**

Finally, in the early morning hours of May 31,

- **the concentrated work began.**

Men worked in crews of various sizes

- **charged with various goats-some given specific mileages to cover,**
- **others under instructions to begin at a specified point and work**

- **in a specified direction until they met another crew working toward them.**

Along thousands of miles of track-approximately

- **half of which was operated by predecessors of today's Southern Railway System**
- **spikes were pulled,**
- **rails moved in to the new gauge,**
- **and more spikes hammered into place.**
- **At shops and rendezvous points throughout the South,**
- **motive power and rolling stock**
- **were being altered to fit the new gauge.**
- **Wheels of cars were moved in,**
- **steam engine brakes and**
- **tires were altered-**
- **and the screeching of axles**
- **being narrowed on lathes joined the ringing of heavy hammers.**

In less than three days,

- **standard-gauge trains were serving the South.**
- **"The work was done economically ,"**
- **an article in the Journal of the Association of Engineering Societies pointed out,**
- **"and so quietly that the public hardly realized it was in progress.**
- **To the casual observer it was an every-day transaction. It was,**
- **however, a work of great magnitude, requiring much thought and mechanical ability.**
- **That it was ably handled is evidenced by the uniform success attained, the prompt changing at the agreed time, and the trifling inconvenience to the public."**

And the Richmond & Danville told its Annual Report readers:

- **"By agreement and prearranged concert**
- **between the Southern Roads operating the 5 feet gauge of tracks,**
- **about June 1 st last the gauge of all the 5-feet tracks of this Company's lines**
- **was changed to the standard adopted of 4 feet 9 in.**
- **This important work was effected under the direction of the General Manager**
- **with great promptness and entire exemption from accident or damage,**
- **and with hardly a perceivable interruption in the regular movement of traffic throughout**
- **the entire connection of this Company's Roads."**

Horatio Allen had written in 1884 that his use of the 5-foot gauge for

- **"the South Carolina Railroad determined the gauges of the Southern road, which continues of that gauge to this time;**
- **but it is to be anticipated that the commercial advantages of uniformity of gauge**
- **will eventually narrow the gauge down to the coal mine gauge of four feet eight and a half inches."**

The final half-inch reduction, though,

- **had to wait for the formation of the Southern Railway Company.**
- **Then, because of the closeness of the South's 4-foot 9-inch gauge**
- **to the standard gauge,**
- **it was accomplished in the normal course of track maintenance and repair.**
- **It completed the job begun many years earlier.**

But the real drama

- **lasted only two days-two days**
- **in which the fields and villages of the South**
- **echoed the clanging of countless hammers driving thousands of spikes-**
- **the days they changed the gauge.**

Financial Services

1. **Chemical Bank International** **1978-1981**
    a. FX Out of proof 92 days for 15+ years
    b. Neither Internal Audit nor PW caught the true status of the FX Books
    c. One Individual had been cooking the books for 15+ years
    d. Turned State's Evidence, Cooperated with FBI, PW, Internal Audit Taught them how to cook books and cover up trails
    e. Got a "Get Out Of Jail Card"
    f. USD$250,000. Tax free and no record

2. **Major NYC Bank**
    a. Programmers wrote code to siphon off mills from each account into a series of off shore account. This was never caught by either internal nor external audits once caught after many years when banks old legacy code was finally reviewed and looked at

3. **MLPFS** **1983-1984**
    a. Installed 17,000 IBM PC XT's, 17,000 Printers, SOD-Security Operations Division OLP
    b. Wrote White Paper on EDI-Paperless Processing for ML CMA Statement Rendition, Implemented in 1987

4. **MMB/HSBC-Replaced 40+ year old Batch Processing Legacy Systems** **1984-1986**
    a. USD$30.0 Program
    b. M&I Marshall & Islay SW, Real Time Systems
    c. Stratus NON-Stop, Fault Tolerant HW
    d. ZBA-Zero Balance Accounting
    e. **From 1945-1988 MMB has lost USD$30.0 M PA in OD's Over Drafts** incurred by MMB from FRBNY on behalf of their "Best Customers"
    f. MMB borrowed $ from FRBNY, credited their best customers accounts but did not charge their best r customers the 1/360th of the FRBNY Overnight Fed Funds Rate
    g. An accrual of these MMB-FRBNY OD's revealed an annual Opportunity Loss of USD$30.0 M PA for MMB vs. USD$30.0 M for turn ken installation of M&I DDA SW Running on Stratus Non Stop HW
    h. A break Even in 12 months

5. **PSE-Pacific Stock Exchange, San Francisco Ca** **1987-1988**
    1. **Out of Proof USD$92.0 M**
    2. **Recouped USD$91.5 M,**
    3. **Recouped remainder USD$500.0 K over 2 years**
    4. **6 previous attempts at manually monitoring of Out of Proofs results in total chaos, confusion**

6. **NYC/MTA/TBTA** **1988-1990**
    1. **RFI, RFP-Mandate replace 55+ year old Electro Mechanical Tape Legacy Systems Built by Robert Moses**
    2. 1988 TBTA Grossed USD$600.0 M Cash
    3. TBTA Historically Lost, Stole 30% PA or USD$180.0 M PA from 1945-1988
    4. With USD$20.0 M EZ-Pass, TDC/CSEE, Replaced Old Legacy Electro Mechanic Paper Tape Systems
    5. POS Terminals, EZ-Pass, ACM-Automatic Coin Machines, CCTV's, SNA-Fiber Backbone, CAT-5 Cabling, Communication Cabinets, UPS

6. **Primary, Secondary, Tertiary Target Issues to be addressed in PMO development**
7. **TDC/CSEE-EZ-Pass Broke Even in less than 2 months**
8. **1990 EZ-PASS TRS saved MTA/TBTA USD$180.0 M PA**
9. **2014 EZ-PSS TRS Saved MTA/TBTA USD$500.0 M Cost Avoidance**

7. JPMC Pre-Post M&A with Bank1One-Installation of ORACLE LDW- 2003-2004

1. **No Compliance, No Rules Based RDBMS**
2. **JPMC merged 26+ times since 1926.**
3. **Ran 26 separate non integrated GL's**
4. **200+ International Branch Network**
5. **No M&I ZBA Accounting Modules to Eliminate JPMC OD's**
6. **JPMC had 26 GL's none of which spoke to each other**
7. **Goal of ORACLE LDW was to consolidate these 26 GL's into 1 Macro GL 100 % Integrated JPMC**

8. BAH-Booz Allen & Hamilton, Brisbane, Sydney, Australia 1994-1995

a. Transformation of Commonwealth Bank, Sydney, Australia
b. Commonwealth Bank, Mortgage Origination Home Loans from 12 Regional Decentralized Australian districts to one centralized Processing Center in Brisbane, Australia
c. Recommended Bar Coding of each Mortgage Origination Folder and subsequent Taxes, Title Documents for Proof Of Ownership and Compliance with The Commonwealth Bank, Australian Central Bank Departments
d. JIT Inventory Control for Home Mortgages
e. Asset Management
f. Inventory Control
g. Aging Files

9. ATT/Bell core, NY, NY, Morristown, NJ, Atlanta, GA 1995-1999

a. **HI-Holiday Inn Global Operations USD$18.0 M Upgrade of 100% of HI Reservations Systems HW/SW POS Terminals,** Printers, V/Sat's, UPS
   i. Domestic
   ii. International
   iii. Logistics Warehouse out of Swayne, GA Shipped out of Atlanta, GA Intl Airport Globally
   iv. Each Parts Air Freight Igloo was shrink wrapped with multiple language instructions included
   v. HI Ancient Inca Complex Maschu Pishu, Peru in the Andes
   vi. Problem Shining Path Marxist rebels we had to discretely provide a cash bribe toll road payment to insure that 100% of the HI Reservations
b. **HI-Holiday Inn Global Operations USD$18.0 M Upgrade of 100% of HI Reservations Systems HW/SW POS Terminals,** Printers, V/Sat's, UPS
   i. Domestic
   ii. International
   iii. Risk Management
   iv. Statistical Forecasting
   v. MTBF
   vi. MTTR
   vii. JIT-Green Supply Chain Logistics Warehouse out of Swayne, GA Shipped out of Atlanta, GA Intl Airport Globally

viii. Each Pallet of Spare, Replacement Parts Air Freight Igloo was shrink wrapped with multiple language instructions included
ix. HI Ancient Inca Complex Maschu Pishu, Peru in the Andes
x. Problem Shining Path Marxist rebels we had to discretely provide a cash bribe toll road payment to insure that 100% of the HI Reservations Systems Kit arrived on time at the HI Branch in the Andes

c. ATT/Bellcore-

i. Installed ATM's on DOD/USN/Ships to allow Officers & Crews to obtain cash 24 x 7 while at sea without needing a formal Naval bursar
ii. Wrote PMO, Logistics, JIT Supply Chain Plans for manufacture of ATM's in Scotland
iii. Risk Management
iv. Statistical forecasting
v. MTBF
vi. MTTR
vii. Scheduled shipping from Scotland, UK to St. Petersburg, FSU
viii. Staging, warehousing, distribution across 10 time FSU zones of ATT-NCR ATM's in Scotland for export to St. Petersburg, FSU Installed 17,000 ATM's in FSU
ix. Program valued at USD$1.2 B

10. Taught PMO To USN/NAVSEA 1999-2001

a. For the management, scheduled maintenance of US and Foreign Shipyards for the servicing, scheduled , unscheduled maintenance of the US Fleet
b. Discovery Analysis
c. Statistical Forecasting
d. MS. Office Suite
   i. Word
   ii. Excel
   iii. Project Management
   iv. Visio Flow Charting
   v. WBS
   vi. Flow Charting
   vii. Data Flow Diagrams
e. PERT
f. Critical Path
g. JIT-Green Supply Chains
h. Asset Management
i. Cos Accounting
j. Case Studies

11. USS Cole Attack In Arabian Sea by Al Kaiada

a. What were the in place procedures when you have been hit
b. Repel Attackers
c. Secure Ship
d. Locate Triage Wounded
e. Locate Account for Dead
f. Notify Pentagon USAN ONO
g. Damage Assessment

h. Damage Reports
i. NAVSEA HQ Locate US Lift Ship Schedule relocation to Arabian Sea to assist USS Cole
j. NAVSEA start ordering replacement parts from USN/NAVSEA inventory , factories
k. USN Sea Lift ship return damaged USS Cole to US East Coast for repairs

12. Don Peppers Of Peppers & Rogers 2014 Linked In Case Study Article on Forecasting the Survivability of WW II US Bomber Command Risk Assessments of each returning Bomber from Bombing Raids against Occupied Europe and Germany

a. Exception Processing
b. Lessons Learned
c. Risk Management
d. Risk ID
e. Risk Resolution
f. Logic, those Allied Bombers who were capable of returning under their own power and landing at home base with structural damages from AA anti-aircraft and aerial combat, were photographed, schematically identified non-critical areas that had been damaged and could therefore be repaired
g. Place critical reengineering attention to most mission critical surface, structural areas on the fuselage for structural reinforcing and up-armoring, in order to offset the mission critical risks of damages to the most vital area of the bombers structure, surface area, fuselage

13. LMC, LLC McKinney, Texas Fleet Management, Fuel Management 2001-2003

a. Privately held 3rd Generation Sand, Rock Mining Operations, Texas & OK
b. 2 Rock Quarries in OK, 66,000 acres of land Along the Red River between Texas & OK sand mining
c. 52 Cement Plant Operations in Texas & OK 2001-2003
d. **Fleet Management**-Formalized documentation of LMC Historical Statistical Analysis of truck break downs, truck repairs on the road and in the shop
e. JIT-Green Supply Chains for Scheduled Maintenance of Fleet Developed JIT-Green Supply chain for spare parts for Scheduled Maintenance of Fleet of 5,000 Peter Built 20 Yard Trucks
f. JIT Procurement of Diesel Fuels, Gasoline, Lubricants
g. Designed Implemented an FMS-Fuel Management System
h. Selected an established real time 24 x 7 FMS HW/SW Systems in San Antonio, Texas for USD$500.0 k, for monitoring of HQ, Mining Ops, 52 Plant sites
i. **FMS Systems** 24 x 7 real time fuel monitoring, dispensing monitoring identified a 30% loss PA since 1968,
j. 2001-2003 LMC bought 30.0 M gallons of fuel PA @USD$3.00 per gallon ,USD$90.0 M PA
k. 30% PA or 9.0 M gallons PA was shorted during fuel deliveries, siphoned off, stolen
l. FMS system eliminated 100% of all internal , external delivery shortings, thefts recouping 30% fuel losses PA valued at 9.0 M gallons x USD$3.00 per gallon = USD$27.0 M recouped an a USD$500.0 K initial Investment

14. **ML HQ installation of 17,000 PC's, Printers, Peripherals 1983-1984**

a. 1983-1984 Wrote A White Paper on implementation of EDI Paperless Processing for paperless generation ML Monthly Statement Rendition,

b. MMB/HSBC Implemented EDI Implemented in 1987 for paperless ML CMA Statement Rendition

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22. MTTR-Mean Time To Repair

a. Statistical determination of the actual required times to repair, replace, correct all mission critical interrelated components that have failed, in order to insure continuity of day to day operations
b. Regression Analysis
c. Staffing Levels
d. Skill sets

23. Risk Management

a. Risk ID
    i. Statistical Analysis Identifying, Documenting the actual types of Risks Identified,
    ii. Statistical Forecasting
    iii. Risk Resolutions,
    iv. JIT-Green Supply Chains,
    v. Logistics
    vi. Asset Management
    vii. Coast Accounting
    viii. LIFO v FIFO
b. Risk Resolution
c. Risk Mitigation
    i. Statistical Analysis Identifying, Documenting the actual types of Risks Identified, to be remediated, repaired
    ii.
d. Risk Modeling

24. Change Management

25. Change Control

26. Forecasting

a. Anticipating specific types of failures by Date, Geographic Locations, Country Code, State/Department, City, Zip-Code, Household Collapses, Building, Floor, Type of HW, SW, Operational Component, Bar Code Numbers

27. **JIT-Green Supply Chain**,
    a. Lean Logistics Analysis derived by Statistically Discovery, Data Collection, Statistical Analysis, Statistical Forecasting

28. **Double Entry Accounting Tools**
    a. Developed For International Trading Families &International Banking Families
    b. were Developed as a result of 12,000+ year old long distance Commerce, Trade, International Banking by sea and by land caravans via Letters of Credit
    c. Dardanelles, Ephesus, Alexandria, Egypt
    d. 1492-Proceedings of The Conference Accounting & Economics In Honour of the 500th Anniversary of the Publication of Luca Pacioli's Summa De Arithmetica, Geometria, Proportioni et Proportinonalita, Siena, Italy 18th-19th November 1992
    e. Ancient Double-Entry Bookkeeping: Lucas Pacioli's Treatise (A.D. 1494 - the Earliest Known Writer on Bookkeeping)
    Oct 3, 2012
    By John B. Geijsbeek

The Silk Route, The East-West Silk Road by Caravan and By Sea

- East of The Bospherous, Constantinople , Istanbul the end of the Silk Route from
- Japan, China, Asia, Burma, Indonesia, Malaysia, Mumbai, India, Pakistan, Kabul, Afghanistan, Persia, Isfahan, Iraq, Syria, Beruit, Cyprus, Tyre, Lebanon, Palestine-Israel, Jordan, Alexandria, Cairo, Egypt, Khartoum, Sudan
- Ephesus, Ankara,
- West of the Bospherous-The Black Sea, Rhine River, Odessa, Crimea, Volga River
- West of the Bospherous The Aegean Seas, Gulf of Marma, Athens, Sparta, Iona, Greece, Rhodes, Carthage, Rome, Marseilles, Sicily, Majorca,
- Pillars of Hercules, Bordeaux, Poitiers, Paris, Calais, Flanders, Netherlands, Rhine Germany, London, Dublin, Ireland, Enniscourthy, Ireland, Low Lands, York, Scotland, Scandinavia

Products

- The East-West exchange of Ideas, Religious, Economic, Political Exchange of Ideas
- #1 Trade Good from China Chinese Paper
- Salts-Italy, Germany, Austria
- Spices
- Cloves-Indonesia
- Tea-China, Japan
- Coffee-Arabia
- Frankincense Emerites
- Murrah Emerites
- Medical Opiates, Persia, Afghanistan, India, Ceylon, Burma, Indo China, China
- Silks-China, India, Pakistan
- Cotton Materials Egypt, India, Pakistan
- Pearls-Red Sea, Pacific Ocean

- Rubies, Diamonds, Africa, India
- Jade-Burma
- Slaves

Ancient Sophisticated Trade Routes between East & West.

Spice Trails Specials DVD

29. **Latitude & Longitude Navigational Grid Maps, Tools Using the North Star,**
    a. were developed as a result of long distance land, caravan, sea Commerce, Trade, Banking

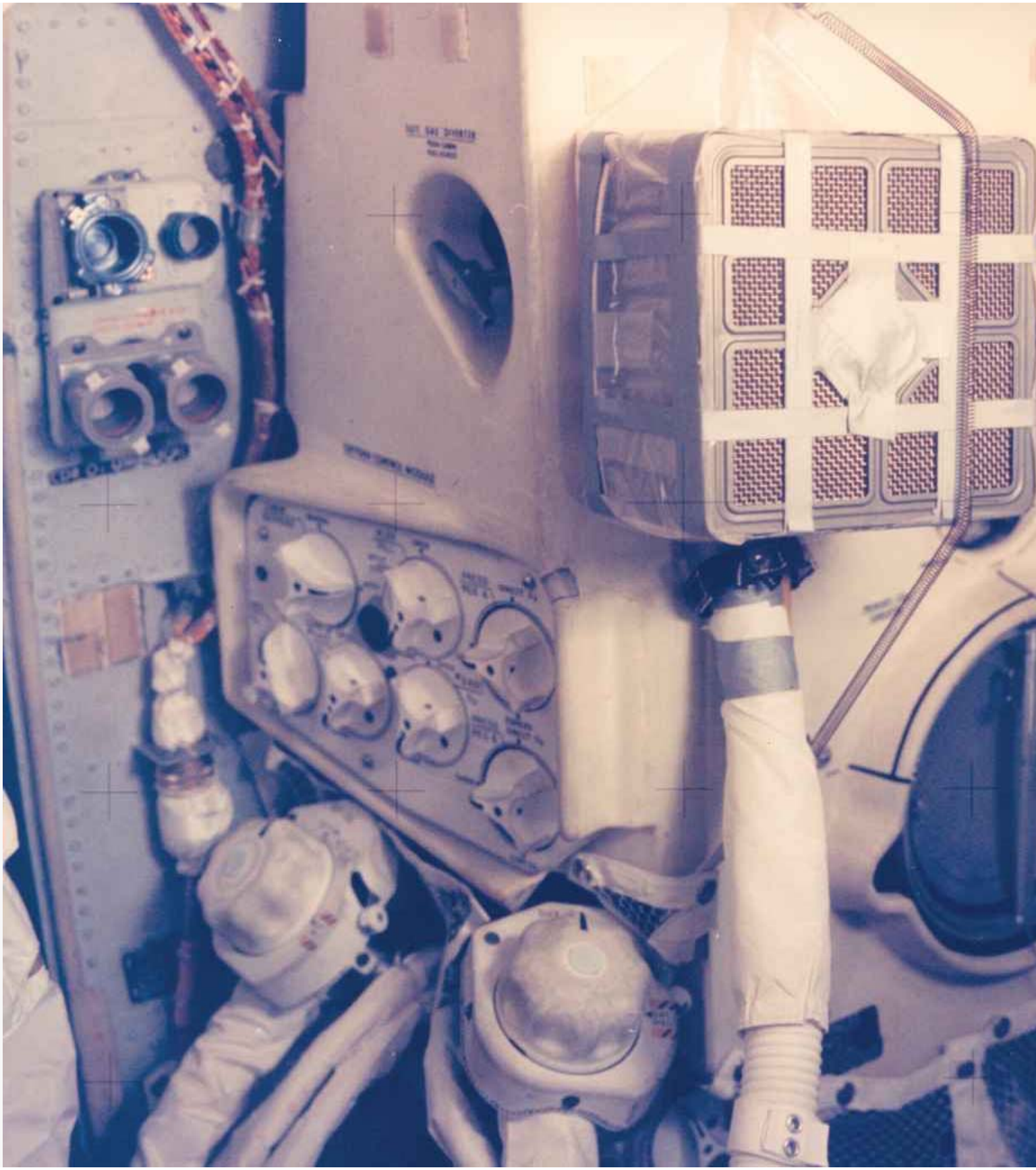
30. **NASA's Apollo 13 Putting A Square Carbon Filter into a Round Hole**

SPACE

THE GREATEST SPACE HACK EVER

HOW DUCT TAPE AND TUBE SOCKS SAVED THREE ASTRONAUTS

By Neel V. Patel Posted October 8, 2014



CO2 Scrubber NASA
In NASA’s 56 years of operation, it has put men on the moon and robots on Mars.

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- **But one of its greatest achievements is less well known: the hack that saved the lives of three stranded astronauts in 1970.**
- **When an oxygen tank exploded as Apollo 13 neared the moon,**
- **The three-man crew had to abort their mission, power down the command module, and move into the lunar module for the journey home.**
- **Designed to house only two people, the craft quickly filled with dangerous levels of carbon dioxide.**
- To save themselves,
- **The astronauts had to somehow attach a square CO2 scrubber to the circular opening of the lunar module's filtration system.**
- The ground team designed an adapter from the limited items on board, including hoses from spacesuits, tube socks, and duct tape.
- Astronaut Ken Mattingly was supposed to fly on Apollo 13, but he was bumped from the mission after being exposed to German measles.
- So when disaster struck, Mattingly was on the ground.
- From there, he assisted with NASA's rescue efforts, and after the Apollo 13 astronauts moved from the Command/Service Module (CSM) to the Lunar Module (LM), he helped them hack an air filter to fit their new quarters. (The CSM breaks down into two other separate modules: the Command Module (CM) and the Service Module (SM).)
- Mattingly gave *Popular Science* an in-depth account of the ordeal.

***Popular Science*: How did the air filtration system work?**
Ken Mattingly:

- In any spacecraft—at least the ones that carry humans—
- Control of the atmosphere is a major design consideration.
- In both the CSM and the LM, the atmosphere flows through a little canister with a filter that is filled with lithium hydroxide.
- The lithium hydroxide will absorb CO2.
- The filter is just to absorb odors and trap dust, so it doesn't clog up some of the small valves that are regulating flow.

PS: How did the system in the Command/Service Module differ from that in the Lunar Module?
KM:

- The CSM ended up with canisters that were rectangular blocks.
- The LM ended up with circular disks—
- Just a big circle with gas flowing in and out through a hole in the center. The two canisters are chemically interchangeable, but not physically interchangeable.
- Designed to house only two people,
- The craft quickly filled with dangerous levels of carbon dioxide.

PS: After the tank blew, why did the astronauts have to move into the Lunar Module?

- **KM:**
- **When the oxygen was rapidly depleting, that meant two things to the CSM.**
- **First, it was going to lose electrical power.**
- **When you run out of oxygen your fuel cells quit, as does your life support and pressurization. T**

- **The CSM also has two small batteries, but you need them to run the Command Module from the time you separate from the Service Module until you get down on the ground.**
- **So we were very, very concerned about doing anything that would tap into the batteries. We said, “Okay, we're gonna stuff these kids in the Lunar Module and live off the LM.”**
- **The LM has all batteries, no fuel cells.**
- **PS: When did the situation in the Lunar Module become a crisis too?**
- **KM: About the time we went around the Moon, the LM started getting the high CO2 light.**
- **And they changed out the [air filtration] canister.**
- **People started saying, “Hmm, you know, we're going to run out of canisters here in a hurry.**
- **What alternatives do we have?" Well, we have this stack of lithium hydroxide in the CSM,**
- **But it doesn't fit in the container [of the LM]. So what can you do?**

The Apollo 13 Crew.
NASA
From left to right: Jim Lovell, Thomas “Ken” Mattingly, and Fred Haise.

PS: Where the astronauts ready for this type of problem?
KM:

- As part of our preparation for these missions, the simulation supervisors injected various anomalies and situations

- **we weren't planning for [into the flight plan exercises]**
- **To test the contingency and emergency procedures we had developed.**

- **On an early mission—it could have been Apollo 10 or Apollo 9—**
- **they created a situation where they had contaminated the atmosphere in the CM,**
- **And they had to figure out how to get it out of there.**
- They said, “Well, why don't we move into the LM?
- And we'll close up and depressurize the CM,
- Get rid of all the cabin atmosphere, then repressurize it, open up the LM, and bring the crew back?”
- **PS:**
- **So how did the team deal with the incompatibility between the CSM canisters and the LM filtration system?**
- **KM:**
- **Well, everybody thought the simulation was really a way-out problem.**
- **No one could think of any rational way you could get into that situation.**
- **But as soon as this [happened to] Apollo 13, somebody said,**
- **“You remember the LM lifeboat?”**
- **And that jogged everyone's memory and they said, “Oh yeah!”**

- "The beauty in this whole thing was, these guys were so prepared for even the most implausible things."
- So how did we do it in that simulation?
- We cut open some plastic bags that we packaged stuff in and, using just plain old gray duct tape, taped a bag around the canister.
- Then we inserted it in the suit hose and taped it to one of the nozzles on each end, so you could blow the air through it. It would take some time to run it, but it would run just like if you put it in the manifold itself.
- We did the same thing [for Apollo 13].

PS: It sounds like it was a fairly calm situation on the ground. Is that really how it was?

- **KM:** The beauty in this whole thing was, these guys were so prepared for even the most implausible things.
- They knew no one had ever simulated exactly what happened, but they had simulated the kind of stress that could be applied to the system and the people in it. They knew what their options were, and had some ideas already in place about where to go.
- In the movie, they played it like nobody ever thought of this.
- They dumped a bunch of junk on the table and said, "Can you figure it out?" That was the only way the movie could convey how we got there. [In reality,] there was total familiarity with the hardware.
- **Why Duct Tape?**
- **The secret to duct tape’s versatility, whether in a spacecraft or an Earth-bound garage, lies in its fabric layer.**
- **Sandwiched between a flexible polyethylene coating and a sticky rubber adhesive, cotton mesh augments the tape’s tensile strength like steel rebar reinforces concrete.**
- **Horizontal and vertical threads, meanwhile, make it easy to tear by hand.**

- ***This article was originally published in the October 2014 issue of* Popular Science. *It has been expanded in this web version.***

Bibliography

Ancient double-entry bookkeeping: Lucas Pacioli's treatise
Apr 5, 2014 |

By John Bart Geijsbeek and Domenico Manzoni

Ancient Double-Entry Bookkeeping: Lucas Pacioli's Treatise (A.D. 1494 - the Earliest Known Writer on Bookkeeping)
Oct 3, 2012

1492-Proceedings of The Conference Accounting & Economics In Honour of the 500th Anniversary of the Publication of Luca Pacioli's Summa De Arithmetica, Geometria, Proportioni et Proportinonalita, Siena, Italy 18th-19th November 1992

By Shubiked

Ancient Double Entry Bookkeeping: Lucas Pacioli's Treatise (A.D. 1494 - the Earliest Known Writer on Bookkeeping)
Oct 3, 2012

By John B. Geijsbeek

Nov 4, 2010 | Kindle eBook

By Richard Kautz

Chaos and Fractals: An Elementary Introduction
Sep 8, 2012 | Kindle eBook

By David P. Feldman

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By Fraser, Simkins

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Risk Management

The Fundamentals of Risk Management

By Marrison, Mc Graw Hill

The Social Psyschology of Organizations,

By Katz & Kahan, 1968

- **Thesis**
- **The Formal Organization vs. The Informal Organization,**
- a question on the NYU-Wagner Graduate School 1974 PHD Entrance Exams
- "…Within every organization there is both a Formal Organization and an Informal Organization and vice a versa…"

Plunkitt of Tammany Hall: a series of very plain talks on very practical politics, delivered by ex-Senator George...
Mar 30, 2011

By George Washington Plunkitt
Nov 1, 1995
By William L. Riordan and Peter Quinn

- "Within city government there is honest corruption and there is dishonest corruption…"
- Honest corruption is when we steal money and hand out patronage to friends and the City's needy
- Dishonest corruption is when we steal money.

The Death and Life of Great American Cities: 50th Anniversary Edition
Sep 13, 2011 | Unabridged
By Jane Jacobs and Donna Rawlins
A Constellation of Ideas About City Planning May 19, 2003

By Jeffrey Leach HALL OF FAME

- This 1961 book by Jane Jacobs, a one-time writer for architectural magazines in New York City, turned the world of city planning on its head. The author, who possessed no formal training in architecture or city planning, relied on personal observations of her surroundings in Greenwich Village in New York City to supply ammunition for her charges against the grand muftis of the architectural profession.
- "The Death and Life of Great American Cities" consists mostly of common sense observations, but there is also a good amount of statistical information, economics, sociology, and some philosophy at the base of the author's arguments. This 1993 Modern Library reprint seeks to bring Jacobs's work to a whole new generation of readers, a necessity when one realizes that a majority of the problems plaguing cities in 1961 continue to be a problem today.
  Jacobs begins her book with a brief history of where modern city planning came from. According to the author, the mess we call cities today emerged from Utopian visionaries from Europe and America beginning in the 19th century.

- Figures such as Ebenezer Howard, Lewis Mumford, Le Corbusier, and Daniel Burnham all had a significantly dreadful impact on how urban areas are built and rebuilt. These men all envisioned the city as a dreadful place, full of overcrowding, crime, disease, and ugliness. Howard wished to destroy big cities completely in order to replace them with small towns, or "Garden Cities," made up of small populations.
- **Similar in thought to Howard, Mumford argued for a decentralization of cities into thinned out areas resembling towns. Le Corbusier, says Jacobs, inaugurated yet another harmful plan for cities: the** "Radiant City." A radiant city consists of skyscrapers surrounded by wide swaths of parks where vast concentrations of people herded into one area could live and work. Burnham's contribution to planning was "City Monumental," where all of the grand buildings (libraries, government buildings, concert halls, landmarks) of a city could be clustered in one agglomeration separated from the dirty, bad city. Jacobs writes that all of these ideas continue to exert influence on the modern city, and that all of these ideas do not work.
- For Jacobs, the key to a successful city rests on one word:
- diversity.
- This is not specifically an ethnic diversity, although Jacobs does vaguely include this in her arguments.
- Rather, diversity means different buildings, different residences, different businesses, and different amounts of people in an area at different times. The antithesis of diversity is what we see today on a stroll through downtown: a bland uniformity of office buildings, apartment dwellings, and houses that stretch as far the eyes can see. In the author's view, this lack of diversification leads to economic stagnation, slums, crime, and a host of other horrors that are all too familiar to viewers of the evening news.
- Especially egregious to Jacobs is the tendency to isolate low-income people in towering projects surrounded by empty space. The lack of embedded businesses in these areas, along with closed in hallways and elevators (which Jacobs calls "interior sidewalks and streets") creates a breeding ground for criminal elements and bad morale among the residents.
- Cities that work best employ a wide range of diverse interests that attract, not repel, people. Unfortunately, bureaucrats and social planners always believe top down planning is better than bottom up initiative. Jacobs tries to show the fallacy of social planning.
- The amount of ground covered in this book is amazing. The author examines the role and practicality of parks, sidewalks, business interests, city government, streets, automobiles versus pedestrians, and boundaries. Repeatedly, Jacobs discovered fatal errors in how planners build cities. She found parks placed in the sunless shadows of skyscrapers or at the end of dead end streets, narrow sidewalks incapable of carrying heavy foot traffic, city blocks so long that people avoided walking down them, and city governments too fragmented to carry on effective management. All of these things eventually led to abandonment and degradation. Even worse, when a planned section of the city failed the planners came back and razed it to the ground in order to replace it with yet more failure.
- One of Jacobs's failings in the book is that she never seems to make the connection between urban planning and social control. The housing projects are a great example. By isolating the poor, blacks as well as whites and other ethnic minorities, the state practices an effective control over these people's lives.
- **This book inspired me to check into the fate of Cabrini-Green, Chicago's notorious housing projects that served as a role model for the abject uselessness of urban planning.**

- **These projects are in the process of being razed and replaced by mixed-income houses that, if Jacobs is accurate, may thrive due to the nearby presence of shopping areas and businesses.**
- **Of course, the planners are still in the game because they are sending most of the poor residents to other areas of the city.**
- I am probably not the best person to judge the merits of this book because I have never been to one of Jacobs's "Great Cities." I had difficulty imagining some of the layouts she mentioned in the book due to the simple fact that I have never seen them. Despite this small problem, there is still plenty of information in this book that does make perfect sense. You do not need to live in New York City or Philadelphia to recognize that parks with no sunlight will not be a big hit with the city denizens, or that older buildings are necessary to a neighborhood because they allow small businesses to exist with low overhead costs. "The Death and Life of Great Cities," despite its age, is still a relevant book well worth reading.

The Power Broker Robert Moses &The Fall of New York

By Robert A. Caro and Robertson Dean, 1975

- **For the sheer magnitude, depth and authority of its revelations, *The Power Broker* stands alone - a huge and galvanizing biography revealing not only the virtually unknown saga of one man's incredible accumulation of power, but the hidden story of the shaping (and mis-shaping) of New York through the past half-century.**
- **Robert Caro's monumental book makes public what few outsiders have known: that Robert Moses was the single most powerful man of our time in the City and in the State of New York. And in telling the Moses story,**
- **Caro both opens up to an unprecedented degree the way in which politics really happens - the way things really get done in America's City Halls and Statehouses - and brings to light a bonanza of vital new information about such national figures as Alfred E. Smith and Franklin D. Roosevelt (and the genesis of their blood feud), and about Fiorello La Guardia, John V. Lindsay, and Nelson Rockefeller.**
- **But *The Power Broker* is first and foremost a brilliant multidimensional portrait of a man - an extraordinary man who, denied power within the normal framework of the democratic process, stepped outside that framework to grasp power sufficient to shape a great city and to hold sway over the very texture of millions of lives. We see how Moses began: the handsome, intellectual young heir to the world of Our Crowd, an idealist. How, rebuffed by the entrenched political establishment, he fought for the power to accomplish his ideals.**
- **How he first created a miraculous flowering of parks and parkways, play lands and beaches –**
- **And then ultimately brought down on the city the smog-choked aridity of our urban landscape, the endless miles of (never sufficient) highway, the hopeless sprawl of Long Island, the massive failures of public housing, and countless other barriers to humane living. How, inevitably, the accumulation of power became an end in itself.**
- **Moses built an empire and lived like an emperor. He was held in fear - his dossiers could disgorge the dark secret of anyone who opposed him. He was, he claimed, above politics, above deals; and through decade after decade, the newspapers and the public believed.**
- **Meanwhile, he was developing his public authorities into a fourth branch of government known as "Triborough" - a government whose records were closed to the public, whose policies and plans were decided not by voters or elected officials but solely by Moses -**

an immense economic force directing pressure on labor unions, on banks, on all the city's political and economic institutions, and on the press, and on the Church. He doled out millions of dollars' worth of legal fees, insurance commissions, lucrative contracts on the basis of who could best pay him back in the only coin he coveted: power. He dominated the politics and politicians of his time - without ever having been elected to any office. He was, in essence, above our democratic system.

- **Robert Moses held power in the state for 44 years, through the governorships of**

1. **Smith,**
2. **Roosevelt,**
3. **Lehman,**
4. **Dewey,**
5. **Harriman, and**
6. **Rockefeller,**

- **and in the city for 34 years, through the mayoralties of**

1. **La Guardia,**
2. **O'Dwyer,**
3. **Impellitteri,**
4. **Wagner, and**
5. **Lindsay.**

- **He personally conceived and carried through public works costing 27 billion dollars - he was undoubtedly America's greatest builder.**
- **This is how he built and dominated New York - before, finally, he was stripped of his reputation (by the press) and of his power (by Nelson Rockefeller). But his work, and his will, had been done.**

The Silk Route, The Silk Road

How the Silk Road Got Its Name

The German geographer Ferdinand von Richthofen coined the term "Silk Road" with the publication of this map in 1877.

Before this date, people referred to the route as the road to Samarkand (or whatever the next major city was).

The Trans Himalayan Trade Routes

Ancient Sophisticated Trade Routes between East & West.

Through the Jade Gate - China to Rome, Vol. 1 & 2

(A Study of The Silk Routes 1st To 2nd Centuries CE)– March 18, 2015

By John E. Hill

This updated, definitive English translation of the complete Chronicle on the Western Regions from the *Hou Hanshu*, presents an intriguing picture of this little-known period of history.

Prepared By: Gerard JC La Tournerie, Wexford Systems, LLC **09282015**
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It describes the origins of the Silk Routes using information collected from soldiers, merchants, envoys and spies.

The text is based on the report to the Chinese Emperor An, circa 125 CE, by Ban Yong, his senior general in the Western Regions.

The Chronicle contains the earliest geographical, historical, political, economic and cultural information in Chinese about

The Roman Empire, Egypt, India, Parthia and many other kingdoms, and also describes the routes between East and West.

Along these arteries travelled people, cultures, languages, philosophies, religions, technologies, animals, plants, countless precious and rare trade items, and the knowledge of distant places.

These exchanges were critical for the development and flowering of the great civilizations of China, Rome, Parthia, the Kushans and India, and unquestionably laid the foundations of modern globalization.

The first edition of this work received critical acclaim from scholars world-wide and is widely quoted in academic works. This much expanded second edition should prove to be an even more useful guide and source-book on the early history of the Silk Routes.

The Silk Road in World History (New Oxford World History) 1st Edition

By Xinru Liu (Author)

The Silk Road was the contemporary name for a complex of ancient trade routes linking

- East Asia with Central Asia,
- South Asia, and
- The Mediterranean world.
- This network of exchange emerged along the borders between
- Agricultural China and
- The steppe nomads during the Han Dynasty (206 B.C.E.-220 C.E.),
- In consequence of the inter-dependence and the conflicts of these two distinctive societies.
- In their quest for
    - Horses,
    - Fragrances,
    - Spices,
    - Gems,
    - Glassware, and
    - Other exotics from the lands to their west,
- **The Han Empire extended its dominion over the oases around the Takla Makan Desert**
- **And sent silk all the way to the Mediterranean, either through the land routes leading to the caravan city of Palmyra in Syria desert,**
- **Or by way of northwest India,**
- **The Arabian Sea and**
- **The Red Sea,**
- **Landing at Alexandria.**

- **The Silk Road survived the turmoil of the demise of the Han and Roman Empires,**
- **Reached its golden age**
- **During the early middle age, when the Byzantine Empire and**
- **The Tang Empire became centers of silk culture and established the models for high culture of the Eurasian world.**
- **The coming of Islam extended silk culture to an even larger area and paved the way for an expanded market for textiles and other commodities.**
- **By the 11th century, however, the Silk Road was in decline because of intense competition from the sea routes of the Indian Ocean.**
- **Using supply and demand as the framework for** analyzing the formation and development of the Silk Road,
- The book examines the dynamics of the interactions of the nomadic pastoralists with sedentary
- Agriculturalists,
- And the spread of new ideas, religions, and values into the world of commerce,
- Thus illustrating the cultural forces underlying material transactions.
- This effort at tracing the interconnections of the
- Diverse participants in the transcontinental Silk Road exchange
- Will demonstrate that the world had been linked through economic and ideological forces long before the modern

By Sceptique500 on June 27, 2011

- No better subject could be found for a "new history", which considers "both the separate and interrelated stories of different societies and cultures", than a history of the Silk Road.
- The "separate" elements refer to sketches of places like Palmyra and Petra,
- Which played a central role at the Western end of the Silk Road.
- "Interrelated" stories can be found e.g. in the extraordinarily well crafted chapter on the Kushan empire: in a few pages the author succeeds in weaving a tapestry of trade, power, multicultural encounter, and the transformation of Buddhism into a spirituality that easily found a home all the way to Japan.

- Books about the Silk Road tend to concentrate on its eastern end: in part, it is the romantic story of Stein and Swedin, discovering long forgotten places and preserving thousands of entombed manuscripts from destruction.
- The Oxus is the Western limit: the Western terminals of the Silk Road get less attention, and the "Indian Spurs" role is down played. Many thanks to Ms Liu for setting the proper accents.

- The storyline might go like this. At the outset, there was the interface between China and the nomads, and the exchange of horses against silk.
- The nomads soon disposed of excess yarn and textiles toward the west, attracting other luxuries in return.
- Over the years, trading systems developed toward the Mediterranean, and toward India (and from there again to the West beyond).
- **Which of the two was more important might be gleaned from the fact that trade and**
- **Buddhism joined (praying and giving) hands on the long road,**
- **Creating the necessary infrastructure for safe traders' passage.**

- **Silk making technology leaked west of China, most notably after Chinese defeat at the Talas River in 751.**

- **Mass production ensued in the Middle East. New weaving technologies and styles of textiles emerged.**
- **Islamic institutions supplanted Buddhism**
- **In ensuring Muslim traders' safe passage to the East.**
- **Reflecting changed market conditions, tea replaced silk as the main exchange staple.**
- **And porcelain left China by boat as the maritime trade around South East Asia strengthened.**

- The Mongols brought advanced weaving technology back to China,
- And developed the golden brocade nasij (Tartar cloth) so much in demand in the West.
- This is what drew the Polos to China.
- The centre of gravity of trade, meanwhile, had shifted to sea lanes,
- In addition, the export of porcelain and tea.
- **When the Yuan dynasty collapsed, and the production of nasij withered,**
- **The southern Silk Road went the same way.**

- Short, informative, well structured, and superbly edited - this book is a benchmark. It is still possible, it is clear from what has been done here, to write well and maintain high standards in a publication. I will hold publishers to this standard and no less.

Empires of the Silk Road

By Christopher Beckwith

The first complete history of Central Eurasia from ancient times to the present day, *Empires of the Silk Road*

- Represents a fundamental rethinking of the origins, history, and significance of this major world region.
- Christopher Beckwith describes the rise and fall of the great Central Eurasian empires, including those of the
- Scythians,
- Attila the Hun,
- the Turks and
- Tibetans, and
- Genghis Khan and
- The Mongols.
- In addition, he explains why the heartland of Central Eurasia led the world economically, scientifically, and artistically for many centuries despite invasions by
- Persians,
- Greeks,
- Arabs,
- Chinese, and others.
- In retelling the story of the Old World from the perspective of Central Eurasia,
- Beckwith provides a new understanding of the internal and external dynamics of the Central Eurasian states and
- Shows how their people repeatedly revolutionized Eurasian civilization.
- Beckwith recounts the Indo-Europeans' migration out of Central Eurasia,
- their mixture with local peoples, and
- the resulting development of the

- Greco-Roman,
- Persian,
- Indian, and
- Chinese civilizations;
- he details the basis for the thriving economy of pre modern Central Eurasia,
- the economy's disintegration following the region's partition
- by the Chinese and Russians in the eighteenth and nineteenth centuries,
- and the damaging of Central Eurasian culture by Modernism;
- and he discusses the significance for world history of the
- Partial reemergence of Central Eurasian nations after the collapse of the Soviet Union.

Empires of the Silk Road

Places Central Eurasia within a world historical framework and demonstrates why the region is central to understanding the history of civilization.

Christopher I. Beckwith, professor of Central Eurasian studies at Indiana University, suggests in his recent book, *Empires of the Silk Road* (Princeton University Press),

- **that 'the most crucial element' of societies all through Central Eurasia--including the ones analyzed by this exhibition—**
- **was the 'sociopolitical-religious ideal of the heroic lord'**
- **And of a 'war band of his friends' that was attached to him and 'sworn to defend him to** the death.'
- **This idea, he suggests, affected the organization of early Islam**
- **As well as the structure of Tibetan Buddhist devotion.**
- **In fact, this 'shared political ideology across Eurasia,'**
- **Mr. Beckwith suggests, 'ensured nearly constant warfare.' The region's history is a history of competing empires; trade became part of what was later called**
- **The Great Game.**

Review

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- **The Great Game. (Edward Rothstein *New York Times*)**

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[T]his is no mere survey. Beckwith systematically demolishes the almost universal presumption that the peoples and powers of Inner Asia were typically predatory raiders, and thus supplied themselves by extracting loot and tribute from more settled populations. . . . With his work, there is finally a fitting counterpart to Peter B. Golden's magnificently comprehensive

- ***An Introduction to the History of the Turkic Peoples: Ethnogenesis and State Formation in Medieval and Early Modern Eurasia and the Middle East,***
- Based on Arabic, Hebrew, Persian, Greek, Latin, and European medieval sources.
- By reading just two books anyone can now sort out
- Charlemagne's Avar Ring,
- the Golden Horde,
- modern Kazakhs and Uzbeks,
- ancient Scyths,
- Borodin's Polovtsian dances (they were Cumans),
- present-day Turks,
- Seljuks,
- Ottomans,
- early Turks, and
- Bulghars and
- Bulgarians, among many less familiar states or nations. (Edward Luttwak *New Republic*)

[E]rudite and iconoclastic, [Empires of the Silk Road] provides a wealth of new ideas, perspectives, and information about the political and other formations that flourished in that large portion of the world known as Central Eurasia. . . . [A] Major contribution to Central Eurasian and world history. (Nicola Di Cosmo *Journal of Global History*)

The Silk Road: A New History

By Valerie Hansen (Author)

The Silk Road is as iconic in world history as the Colossus of Rhodes or the Suez Canal.

But what was it, exactly? It conjures up a hazy image of a caravan of camels laden with silk on a dusty desert track, reaching from China to Rome.

The reality was different--and far more interesting--as revealed in this new history.

In The Silk Road, Valerie Hansen describes the remarkable archeological finds that revolutionize our understanding of these trade routes.
For centuries, key records remained hidden--sometimes deliberately buried by bureaucrats for safe keeping.

But the sands of the Taklamakan Desert have revealed fascinating material, sometimes preserved by illiterate locals who recycled official documents to make insoles for shoes or garments for the dead.

- **Hansen explores seven oases along the road, from Xian to Samarkand,**

- Where merchants, envoys, pilgrims, and travelers mixed in cosmopolitan communities, tolerant of religions from Buddhism to Zoroastrianism.
- There was no single, continuous road, but a chain of markets that traded between east and west. China
- And the Roman Empire had very little direct trade.
- **Chinas main partners were the peoples of modern-day Iran,**
- Whose tombs in China reveal much about their Zoroastrian beliefs.
- **Silk was not the most important good on the road;**
- **paper, invented in China before Julius Caesar was born,**
- **had a bigger impact in Europe,**
- While metals, spices, and glass were just as important as silk.
- **Perhaps most significant of all was the roads**
- **Transmission of ideas, technologies, and artistic motifs.**
- **The Silk Road is a fascinating story of archeological discovery, cultural transmission, and the intricate chains across Central Asia and** China

Spice Trails Specials DVD

- **This informative VD lists all of the known spices grown around the world, harvested, processed, dried and exported globally**
- **The far reaching Impact of Spice Trade on**
    - **Global History, Trade, Commerce,**
    - **Shipping, Ship Designs,**
    - **Navigation of the Seas**
    - **Latitude & Longitude**
    - **Navigational Records Keeping Navigators Logs**
    - **Sextants, Optics for Telescopes for "Shooting the Sun & the North Star in the Northern Hemisphere & the Southern Cross in the Southern Hemisphere**
    - **Establishment of the Prime Meridian Greenwich England, & the Subsequent Meridians Globally**
    - **Navigation, Navigational Laws of the Sea**
    - **Astronomy, Cartography Map Making,**
    - **Double Entry Accounting Systems**
    - **International Economics, Finance,**
    - **International Banking, International Letters of Credit, Cash Letters, FX,**
    - **Trading Stations**
    - **Trading Towns**
    - **Coaling Stations**
    - **Colonialism**
    - **Colonial Empires**
    - **Geo-Political Alliances**
    - **Warfare Protection of those Colonial Possessions Raw Resource**
    -