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Our Activities

- An Association with over 600 members from India and abroad working since last 68 years for the growth and development of Leather and its allied industries.
 - Organize seminars, symposiums, workshops in order to share information, knowledge & latest development and interactions for the benet of all concerned.
 - Organize Human Resource Development programmes on regular basis.
 - Publish for over 60 years, a technical monthly journal namely "Journal of Indian Leather Technologists' Association" (JILTA), widely circulated through out the World.
 - Publish books for the benet of the students at various levels of study, for the Research Scholar and the Industry.
 - Work as interface between Industry and the Government.

Heuley

Assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies for the growth of the Industry.

Indian Leather Technologists' Association

[A Member Society of International Union of Leather Technologists' and Chemists Societies (IULTCS)]

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIA-TION (JILTA)

Indian Leather Technologists' Association is a premier organisation of its kind in India was established in 1950 by Late Prof. B.M.Das. It is a Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS).

The Journal of Indian Leather Technologists' Association (JILTA) is a monthly publication which encapsulates latest state of the art in processing technology of leather and its products, commerce and economics, research & development, news & views of the industry etc. It reaches to the Leather / Footwear Technologists and the decision makers all over the country and overseas.

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Fiscal State of India at a glance



The economy likely declined at one of the sharpest paces on record in Q1 FY 2020 (April–June) as lockdown measures remained in place for most parts of the country and, in turn, hammered economic activity. The private-sector PMI averaged significantly lower in the quarter compared to the previous period, indicating sharp deteriorations in the manufacturing and services sectors. Meanwhile, despite a softer contraction in industrial production in June, output fell severely in Q1 FY 2020. Turning to Q2 FY 2020, the economy remains gloomy, with the composite PMI for July dipping due to a sharper deterioration in the manufacturing sector, unemployment remaining elevated, and the threat of extended lockdown restrictions amid heightened new Covid-19 cases likely weighing on business and consumer confidence.

The economy is expected to contract sharply in FY 2020 due to containment measures hampering domestic activity, and amid anaemic external demand. A major downside risk is a prolongation of lockdown measures. On a brighter note, fiscal stimulus and a more accommodative monetary policy should support the economy, although the rising fiscal deficit clouds the outlook. Economic panellists project GDP to fall 5.0% in FY 2020, which is down 1.0 percentage point from last month's forecast, and increase 7.6% in FY 2021.

State of population of India

The economy likely declined at one of the sharpest paces on record in Q1 FY 2020 (April–June) as lockdown measures remained in place for most parts of the country and, in turn, hammered economic activity. The private-sector PMI averaged significantly lower in the quarter compared to the previous period, indicating sharp deteriorations in the manufacturing and services sectors. Meanwhile, despite a softer contraction in industrial production in June, output fell severely in Q1 FY 2020. Turning to Q2 FY 2020, the economy remains gloomy, with the composite PMI for July dipping due to a sharper deterioration in the manufacturing sector, unemployment

remaining elevated, and the threat of extended lockdown restrictions amid heightened new Covid-19 cases likely weighing on business and consumer confidence.

	2015	2016	2017	2018	2019
Population (million)	1,283	1,300	1,317	1,334	1,352

GDP of India per capita

Economic growth slowed in the first quarter of calendar year 2020 (the fourth quarter of fiscal year 2019), with GDP expanding 3.1% (Q4: +4.1% year-on-year), which is the lowest reading since at least 2012. The 3.1% reading was better than market analysts had expected, though, with 2.1% growth being the general expectation. The Q1 reading is yet to fully take into account the economic effects of the national lockdown announced on 25 March due to the coronavirus pandemic: these effects will be more visible in the national accounts data for Q2 onwards. Private consumption growth fell to an over five-year low of 2.7% in the first quarter (Q4: +6.6% yoy). Meanwhile, fixed investment declined at a sharper pace of 6.5% in Q1, down from the 5.2% decrease in the previous guarter. However, public spending ticked up marginally to a 13.6% increase in Q1 (Q4: +13.4% yoy). On the external front, exports of goods and services contracted 8.5% in Q1, marking the worst reading since Q4 2015 (Q4: -6.1% yoy). Conversely, imports of goods and services declined at a slower pace of 7.0% in Q4 (Q4: -12.4%) yoy). Given that extensions to the national lockdown have been announced since it was first implemented, coupled with the effects of the global economic downturn, Kunal Kumar Kundu, India economist at Société Générale, said:

"We now expect 2Q20 to be a virtual washout, with the economy likely to contract by as much as 20.8% yoy. We see a further contraction in 3Q20, as rebooting the economy will likely take longer than expected."

Economic panellists see the economy contracting 0.2% in FY 2020, which runs from April 2020 to March 2021, which is



Editorial ____

down 1.6 percentage points from last month's forecast. In FY 2021, our panel projects GDP to expand 7.2%.

	2015	2016	2017	2018	2019
GDP per capita (USD)	1,633	1,766	2,018	2,023	2,113

Consumption Pattern of India

Economic growth slumps in January-March

Economic growth slowed in the first guarter of calendar year 2020 (the fourth quarter of fiscal year 2019), with GDP expanding 3.1% (Q4: +4.1% year-on-year), which is the slowest reading since at least 2012. The 3.1% reading was better than market analysts had expected, though, with 2.1% growth being the general expectation. The Q1 reading is yet to fully take into account the economic effects of the national lockdown announced on 25 March due to the coronavirus pandemic; these effects will be more visible in the national accounts data for Q2 onwards. Private consumption growth fell to an over five-year low of 2.7% in the first quarter (Q4: +6.6% yoy). Meanwhile, fixed investment declined at a sharper pace of 6.5% in Q1, down from the 5.2% decrease in the previous quarter. However, public spending ticked up marginally to a 13.6% increase in Q1 (Q4: +13.4% yoy). On the external front, exports of goods and services contracted 8.5% in Q1, marking the worst reading since Q4 2015 (Q4: -6.1% yoy). Conversely, imports of goods and services declined at a slower pace of 7.0% in Q4 (Q4: -12.4% yoy). Given that extensions to the national lockdown have been announced since it was first implemented, coupled with the effects of the global economic downturn, Kunal Kumar Kundu, India economist at Société Générale, said:

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	2015	2016	2017	2018	2019
Consumption (annual variation in %)	7.9	8.1	7.0	7.2	-

Investment data in India

	2015	2016	2017	2018	2019
Investment (annual variation in %)	6.5	8.5	7.2	9.8	-

Industrial position in India

Industrial production increased 4.5% in February compared to the same month a year earlier, up from January's revised 2.1% increased (previously reported: +2.0% year-on-year). February's improved reading was due to a faster increase in manufacturing output, which accounts for the bulk of industrial production. In addition, output of mining and electricity increased quickly. By use, industrial production was particularly boosted by a sharp rise in intermediate goods production. Annual average growth in industrial production accelerated to 1.1% in February from 0.7% in January.

Economic panellists expect industrial production to increase 3.2% in FY 2020, which is unchanged from last month's projection. For FY 2021, the panel expects industrial output to expand 4.5%.

	2015	2016	2017	2018	2019
Industrial Production (annual variation in %)	3.3	4.6	4.4	3.8	-1.2

Public Debt in India

Authorities act to soften economic blow from coronavirus pandemic

Prime Minister Modi announced on 14 April that the national lockdown, which was first enforced on 25 March to curb the spread of the coronavirus and severely curtailed the freedom of movement and non-essential business, will be extended until 3 May. However, to mitigate the effects of the lockdown on the economy—the unemployment rate reportedly shot up to nearly 25% in April—state governors will ease restrictions from 20 April, depending on the spread of the virus in their regions. The easing will be applied to designated activities, particularly agricultural activity. Moreover, to support struggling businesses and consumers, the government has announced a range of fiscal policies in recent weeks, and the Reserve Bank of India has loosened monetary policy. Nevertheless, the economic effects of the pandemic will be severe.

Editorial —



Fiscal stimulus worth approximately 1% of GDP has been announced so far by federal and state governments, including cash transfers to lower-income households and an easing of the criteria for receiving unemployment benefits. Measures to ease the tax burden have also been announced, including delaying income tax filing deadlines, while additional resources have been devoted to providing healthcare. Reflecting on the fiscal stimulus taken so far and possible additions to it, Sonal Varma and Aurodeep Nandi of Nomura noted it will likely "fall short" in cushioning the severe blow inflicted by the pandemic.

On the relaxation of the lockdown measures, Prachi Mishra and Andrew Tilton of Goldman Sachs stated: "Our reading of the relaxation rules is that, despite some restrictions being removed, major parts of the economy would remain closed during the lockdown extension phase, and this would continue to weigh on economic activity." On the economic outlook, they added: "We expect a strong sequential rebound in the second half of the year. In aggregate, India's policy effort to control the spread of the virus has been significant, and India's measures remain among the most restrictive across the region."

Economic panellists are currently evaluating their forecasts. New Consensus Forecasts for the Indian economy will be available from 28 April.

	2015	2016	2017	2018	2019
Public Debt (% of GDP)	68.8	68.7	69.4	69.4	71.9

Reserve Bank of India slashes rates at unscheduled May meeting

In an unscheduled monetary policy meeting ending on 22 May, which replaced the meeting scheduled to end on 5 June, the Reserve Bank of India (RBI) Governor Shaktikanta Das announced fresh monetary policy loosening. This adds to the array of measures the RBI has already introduced as part of efforts to mitigate the economic consequences of the coronavirus pandemic and national lockdown. The RBI lowered all interest rates by 40 basis points. This brought the reverse repurchase rate (the rate at which banks are paid for depositing cash at the RBI), repurchase rate (what the RBI charges banks for borrowing from it) and marginal standing facility rate (what the RBI charges banks for borrowing from it at times of tight liquidity) down to 3.35%, 4.00% and 4.25%, respectively.

In addition to lowering rates, the RBI announced lessconventional easing measuring, including extending the current loan moratorium by another three months until 31 August and easing pre- and post-shipment export credit rules to help exporting businesses. Regarding the outlook, the RBI underlined it would continue with its accommodative stance for as long as necessary to revive growth, while ensuring that inflation remains within the target.

Commenting on the monetary policy development, Prakash Sakpal of ING said: "[We] view today's move as an affirmation that the recently announced 10% of GDP stimulus package (including all previously announced monetary easing form the RBI) isn't enough to help the economy withstand the Covid-19 storm. The much-touted big stimulus package is more about long-term structural economic reforms rather than an immediate real boost to the economy. As such, the central bank is carrying the burden of supporting growth."

Economic Forecast panellists are currently evaluating their interest rate forecasts. New Consensus Forecasts will be available from 26 May.

	2015	2016	2017	2018	2019
Money (annual variation in %)	11.5	6.7	21.8	14.3	10.3

Inflation Rate in India

Price pressures ease in May

The National Statistical Office of India released only partial consumer price index (CPI) data for May, as it did previously for April, because of logistical issues related to the coronavirus pandemic. Nevertheless, consumer price pressures appeared to ease in May, according to available data, with both food and beverages, and fuel and light becoming cheaper month-onmonth. In terms of CPI inflation, Nomura research analysts Sonal Varma and Aurodeep Nandi created a "truncated CPI" accounting for 63.1% of the original index and measured that CPI inflation slowed to 6.9% in May versus 8.3% in April, reflecting an easing of food price pressures. The Reserve Bank of India's (RBI) target range for CPI inflation is 2.0% to 6.0%. Unlike for CPI, authorities were able to release complete wholesale price index (WPI) data for May, which showed prices falling 2.2% from March, the previous month for which data is available, after declining 1.5% in February. In annual terms, meanwhile,

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wholesale prices declined 3.2% in May, contrasting the 0.4% increase in March.

Economic Forecast panellists project consumer price inflation to average 3.7% in FY 2020, which ends in March 2021. The forecast is up 0.1 percentage points from last month's forecast. In FY 2021, the panel projects consumer price inflation to average 4.1%. Meanwhile, our panel sees wholesale inflation averaging 1.5% in FY 2020, which is down 0.1 percentage points from last month's report, and 3.1% in FY 2021.

	2015	2016	2017	2018	2019
Inflation Rate (CPI, annual variation in %, eop)	4.8	3.9	4.3	2.9	5.9

Interest rate in India

Reserve Bank of India slashes rates at unscheduled May meeting

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The RBI lowered all interest rates by 40 basis points. This brought the reverse repurchase rate (the rate at which banks are paid for depositing cash at the RBI), repurchase rate (what the RBI charges banks for borrowing from it) and marginal standing facility rate (what the RBI charges banks for borrowing from it at times of tight liquidity) down to 3.35%, 4.00% and 4.25%, respectively. In addition to lowering rates, the RBI announced less-conventional easing measuring, including extending the current loan moratorium by another three months until 31 August and easing pre- and post-shipment export credit rules to help exporting businesses. Regarding the outlook, the RBI underlined it would continue with its accommodative stance for as long as necessary to revive growth, while ensuring that inflation remains within the target. Commenting on the monetary policy development, Prakash Sakpal of ING said: "[We] view today's move as an affirmation that the recently announced 10% of GDP stimulus package (including all previously announced monetary easing form the RBI) isn't enough to help the economy withstand the Covid-19 storm. The much-touted big stimulus package is more about long-term structural economic reforms rather than an immediate real boost to the economy. As such, the central bank is carrying the burden of supporting growth."

Economic Forecast panellists are currently evaluating their interest rate forecasts. New Consensus Forecasts will be available from 26 May.

	2015	2016	2017	2018	2019
Policy Interest Rate (%)	6.75	6.25	6.00	6.25	4.40

Stock market position in India

The economy likely declined at one of the sharpest paces on record in Q1 FY 2020 (April–June) as lockdown measures remained in place for most parts of the country and, in turn, hammered economic activity. The private-sector PMI averaged significantly lower in the quarter compared to the previous period, indicating sharp deteriorations in the manufacturing and services sectors. Meanwhile, despite a softer contraction in industrial production in June, output fell severely in Q1 FY 2020. Turning to Q2 FY 2020, the economy remains gloomy, with the composite PMI for July dipping due to a sharper deterioration in the manufacturing sector, unemployment remaining elevated, and the threat of extended lockdown restrictions amid heightened new Covid-19 cases likely weighing on business and consumer confidence.

	2015	2016	2017	2018	2019
Stock Market (annual variation in %)	-9.4	16.9	11.3	17.3	-23.8

Exchange Rate in India

The rupee crashes to record low due to large economic imbalances and suppressed investor appetite for emergingmarket assets

The rupee weakened to a historic high against the USD in September, compounding the poor performance of recent months. This was largely due to India's economic imbalances, as demonstrated by the merchandise trade deficit which has reached multi-year highs in recent months, and falling investor confidence in developing economies. On 11 September, the



rupee traded at 72.6 per U.S. dollar, worsening 5.4% from the same day a month earlier and the weakest it has been against the USD in history. So far this calendar year, the rupee has shed 13.6% of its value against the dollar.

The rupee's recent woes have come amid resurging oil prices as of 11 September, Brent crude oil prices rose more than 40% compared to the same day a year earlier. This has put enormous pressure on India's merchandise trade balance given that India imports most of its oil and has underpinned inflationary pressures. Moreover, Focus Economics Consensus Forecast panellists expect the current account deficit to deteriorate this year. In addition to higher oil prices, investors have been fleeing emerging-market assets in recent months, most evidently in Turkey and Argentina. This follows the tightening of monetary policy in major developed economies and the erection of trade barriers around the world, dampening global growth potential. With a similar scenario affecting capital markets in India, this has resulted in outflows from the stock and bond markets, worsening the current account deficit.

Looking ahead, economic panellists see the rupee strengthening from recent lows, ending FY2018 (which ends in March 2019) at 68.2 INR per USD and ending FY 2019 at INR 67.9 per USD.

	2015	2016	2017	2018	2019
Exchange Rate (vs USD)	66.25	64.86	65.11	69.19	75.34

Current state of account in India

The economy likely declined at one of the sharpest paces on record in Q1 FY 2020 (April–June) as lockdown measures remained in place for most parts of the country and, in turn, hammered economic activity. The private-sector PMI averaged significantly lower in the quarter compared to the previous period, indicating sharp deteriorations in the manufacturing and services sectors. Meanwhile, despite a softer contraction in industrial production in June, output fell severely in Q1 FY 2020. Turning to Q2 FY 2020, the economy remains gloomy, with the composite PMI for July dipping due to a sharper deterioration in the manufacturing sector, unemployment remaining elevated, and the threat of extended lockdown restrictions amid heightened new Covid-19 cases likely weighing on business and consumer confidence.

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	2015	2016	2017	2018	2019
Current Account (% of GDP)	-1.1	-0.7	-1.8	-21	-

Trade balance in India

Merchandise exports decreased 34.6% in March from the same month a year earlier, contrasting the 2.9% increase in February and amounting to a total value of USD 21.4 billion. The decrease in shipments in March was broad based across the economy, with 29 out of the 30 major categories of shipments registering falls in the month, and due to the coronavirus pandemic hitting external demand. Merchandise imports, meanwhile, slumped 28.7% in March, contrasting the 2.5% increase in February and amounting to USD 31.2 billion; imports of oil, which constitute around one-third of total merchandise imports, fell 15.0%. The merchandise trade deficit narrowed to USD 9.8 billion from the USD 11.0 billion shortfall in the same month a year earlier. The 12-month trailing sum of the trade deficit narrowed to USD 152.9 billion in March from USD 154.1 billion in February.

Economic panelists forecast that exports and imports will expand 4.1% and 4.7% in FY 2020, respectively, bringing the merchandise trade deficit to USD 175.0 billion. In FY 2021, our panel projects exports and imports to expand 6.9% and 6.9%, respectively, resulting in a merchandise trade deficit of USD 177.0 billion.

	2015	2016	2017	2018	2019
Trade Balance (USD billion)	-117.3	-108.9	-158.6	-182.3	-153.5

Indian Exports (in USD)

	2015	2016	2017	2018	2019
Exports (USD billion)	262	275	305	331	314

India - Imports (%) Data

	2015	2016	2017	2018	2019
Imports (annual variation in %)	-15.3	1.3	20.5	10.7	-8.9

International Reserves of India

The economy likely declined at one of the sharpest paces on record in Q1 FY 2020 (April–June) as lockdown measures remained in place for most parts of the country and, in turn,





hammered economic activity. The private-sector PMI averaged significantly lower in the quarter compared to the previous period, indicating sharp deteriorations in the manufacturing and services sectors. Meanwhile, despite a softer contraction in industrial production in June, output fell severely in Q1 FY 2020. Turning to Q2 FY 2020, the economy remains gloomy, with the composite PMI for July dipping due to a sharper deterioration in the manufacturing sector, unemployment remaining elevated, and the threat of extended lockdown restrictions amid heightened new Covid-19 cases likely weighing on business and consumer confidence. hammered economic activity. The private-sector PMI averaged significantly lower in the quarter compared to the previous period, indicating sharp deteriorations in the manufacturing and services sectors. Meanwhile, despite a softer contraction in industrial production in June, output fell severely in Q1 FY 2020. Turning to Q2 FY 2020, the economy remains gloomy, with the composite PMI for July dipping due to a sharper deterioration in the manufacturing sector, unemployment remaining elevated, and the threat of extended lockdown restrictions amid heightened new Covid-19 cases likely weighing on business and consumer confidence.

	2015	2016	2017	2018	2019
International Reserves (USD)	356	373	421	414	476

External Debt of India

The economy likely declined at one of the sharpest paces on record in Q1 FY 2020 (April–June) as lockdown measures remained in place for most parts of the country and, in turn,

	2015	2016	2017	2018	2019
External Debt (% of GDP)	23.1	20.5	19.9	20.1	

**Source : Ministry of Finance and Focus Economics Calculations.

Gouliam Nukherjee

Dr. Goutam Mukherjee Hony. Editor, JILTA

Read and Let Read :-



Solidaridad Corner_____





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From the desk of General Secretary



70TH FOUNDATION DAY CELEBRATION & PROF. B. M. DAS MEMORIAL LECTURE



At the present scenario due to COVID – 19 and frequent Lock down, the above was organized on virtual platform (Web based Zoom Cloud), on Friday the 14th August, 2020 at 05.00 PM onwards.

The programme commenced with the introductory speech by Mr. Susanta Mallick, General Secretary, ILTA followed by

Welcome Address by the President of ILTA Mr. Arnab Jha.

Thereafter Mr. Mallick announced the names of the award winners and informed them that the respective awards would be sent to them through courier.



Ms. Pranita Chakraborty – Winner of both B. M. Das Memorial Medal & J. M. Dey Memorial Medal for securing 1st Class 1st Position in B. Tech, Leather Technology Examination of Moulana Abul Kalam Azad University of Technology, West Bengal in 2020,

- b) This year there was no candidate and winner of B. M. Das Memorial Medal for securing 1st Class 1st Position in M. Tech, Leather Technology Examination of Moulana Abul Kalam Azad University of Technology, West Bengal in 2019.
- c) This year there was no candidate and winner of B. M.
 Das Memorial Medal for securing 1st Class 1st Position in B. Tech, Leather Technology Examination of Anna University in 2020, as the Examination were still pending to be completed.

in B. Tech, Leather Technology Examination of Anna University in 2020, as the Examination were still pending to be completed.



d) Dr. Dibyendu Bikas Datta – Winner of J. Sinha Roy Memorial Award for his article titled "Impact of the Leather Industry on Human & Environmental Health" published in February, 2019 issue of JILTA adjudged the Best of all articles published in JILTA in calendar year 2019 by a committee

consisting of Prof. (Dr.) Sanjoy Chakraborty, Principal, GCELT and Dr. Dipankar Chaudhuri, Scientist & Head, RCED, CLRI, Kolkata.

Mr. Jha then introduced the Speaker of the day to the participants and requested him to deliver the Prof. B. M. Das Memorial Lecture.



Prof. Saikat Maitra, Vice Chancellor, Moulana Abul Kalam Azad University of Technology, Kolkata then delivered his valuable lecture titled "Post COVID Challenges for the Technical Institutes to empower the technologists for dedicated service for Nation build up".

After completion of the lecture, Mr. Mallick offered heartiest gratitude to Prof. Maitra and informed him that the Memento will be sent to him by courier at the earliest. At the same time he also offered the formal Vote of Thanks to the participants, members, industry and ILTA office, for successful completion of the Webinar and their participation in large numbers.

There were about 65 - 70 participants in the event.



You are requested to :-

- a) Kindly inform us your 'E-Mail ID', 'Mobile No', 'Land Line No', through E-Mail ID: <u>admin@iltaonleather.org</u> or over Telephone Nos. : <u>24413429 / 3459</u>. This will help us to communicate you directly without help of any outsiders like Postal Department / Courier etc.
- b) Kindly mention your Membership No. (If any) against your each and every communication, so that we can locate you easily in our record.

(Susanta Mallick)

Read and Let Read :-

General Secretary and the Members of the Executive Committee are available to interact with members at 19.30 hrs, over Phone/Conference call on every Thursday





IULTCS EC ACTIVITIES REPORT AUGUST' 2020

This is for all IULTCS representatives:

It's August and most of the Leather activities will remain virtual until the end of the year. We all miss the friendship and working sessions with our colleagues. As of today, we have optimism. Our Leather sector shows signs of recovery and we will continue working to have a bright future.

At the IULTCS Executive Committee we have a very motivated team and had several productive Zoom meetings. Here is a brief communication on the activities to date. We have exciting news!

I. Update from the commissions:

- IUR: Michael : YLSG 2021 has been launched on the IULTCS web site. Dr. Michael Meyer and Dr. Haiko Schulz (FILK) have made a comment to ECHA supporting the 3-ppm limit of Chrome VI on leather. Thank you, Michael, and Haiko for the great representation of IULTCS. Here is an excerpt: "The statistical data give in annex A of ISO 17075-2 and annex B of ISO 17075-1 clearly show that the reproducibility is about 50 % for results close to the limit of quantitation (3 mg/kg). Therefore, all experts active in the related standardisation committee agreed that the reduction of limit of quantitation of these methods is not possible. Based on all available information and the experience of many experts in leather testing the IULTCS do not see any possibilities to reduce the limit of quantitation to 1 mg/kg."
- IUE : Wolfram : The Tannery Effluent videos are on the website and they are a great visual tool to demonstrate efficient tannery effluent treatments.
- IUT : Ivan is organizing a list of the institutes for training and circulate to all members. Will also emphasize the importance of training, links, learning management platforms. The links will be shared with UNIDO and IULTCS.

- IUL : Christine has made the Press Releases for the YLSG 2021 and IULTCS congress 2012 and organized the Zoom meetings. Thank you.
- IUF/IUC/IUP Campbell : The IUC/WG1 held 2 virtual meetings (16. June & 07. July) to consider technical comments submitted for draft versions of new and revised chemical test method Standards:
- 1) New Standards to be published shortly :
 - 1ISO 13365-1 Chemical analysis of preservatives in leather – acetonitrile extraction
 - 1ISO 13365-2 Chemical analysis of preservatives in leather – artificial perspiration extraction
 - 1ISO 17234-1 Azo dyes in leather, determination of forbidden aromatic amines
- 2) Revised Standards in preparation for formal vote of approval :
 - ISO 17226-1 Chemical analysis of formaldehyde in leather – HPLC method. (Derivatization at neutral pH to avoid possible continuing formation of formaldehyde that occurs at low pH)
 - ISO 18219-1 Chemical analysis of SCCP in leather
 - ISO 18219-2 Chemical analysis of MCCP in leather
 - ISO 27587 Chemical analysis of formaldehyde in chemicals
- 3) Other methods :
 - ISO 17072-2 Chemical analysis of total metals in leather. Need to revise the extraction procedure for titanium.
 - ISO 23702-1 Chemical analysis of PFC in leather. Need to update in coordination with other interested technical committees.



IULTCS Corner —

II. Additional activities :

Observer members : IULTCS has approved Leather Naturally and UNIDO as Observer Members.

We have committed that IULTCS will be the Scientific arm of Leather Naturally. IULTCS will collaborate with articles and presentations to Leather Naturally; also helping to answer technical questions of members. This will be done by our Commissions and members on an "as needed" basis. This integration is very important to strengthen both organizations, create dynamism and motivate the leather sector. We are looking forward to working closely with Leather Naturally.

2021 Congress : Our next IULTCS Congress will now be held on the 3rd - 5th November 2021 in Addis Ababa, Ethiopia. Please note this date in your agenda and very importantly inform your association colleagues. **New IULTCS website :** Patricia, Julian and I are working on the new website that will be optimized for mobile devices to be launched in September. We thank Patricia, Julian and ATC for the great collaboration on the new website (ATC is supporting the new website and social media through Julian as consultant. Thank you Jean-Pierre). Patricia and Julian will continue to promote IULTCS on LinkedIn and Facebook. Please follow us.

Note : Zoom call September 21 at 14:00 CET with all the association representatives (and EC). We want to encourage the associations to have more participation in the IULTCS activities and share the information of the local events on the website and social media. Christine will send you an invitation for the Zoom call. Thanks Christine for organizing the meeting.

Thank you all for the great work you do in your organization and at IULTCS. Together we are strong. Be safe and healthy.

(**Source : Email of Dr. Luis A. Zugno, IULTCS President, dated 12/08/2020)





The Evocative, Be Wildering yet, Fascinating Quantum Theory

Dr. Buddhadeb Chattopadhyay

Former Principal of Govt. College of Engineering & Leather Technology, Kolkata & Principal, MCKV Institute of Engineering, Liluah, Howrah, W. B.





Introduction : Depending on the variation of perceptions, the "**Quantum Theory**" can be described as evocative, bewildering and fascinating theory. The three theories that had shaken the world to know the construction and properties of macroscopic or microscopic bodies are 1) Einstein's Special Theory of Relativity in 1905 to conceptualize the things surrounding all of us – the space and the time, 2) again, Einstein's General Theory of Relativity 10 years after, focusing our attention towards origin and the nature of the weakest force of the Nature – the Gravity, encompassing macroscopic particle of enormous mass confined in a relatively smaller dimension, like stars, planets etc. and last but not the least, 3) the Quantum Theory – the theory that governs the behavior of tiny microscopic particles that in turn construct the entire macroscopic world.

Of which, quantum theory is perhaps the prime example of the infinitely esoteric and profoundly useful in almost every aspects of science, which it does embrace. On the shoulders of the

giants, the scientists really dreamt how the stuffs are made of. Fundamental scientific discoveries may not necessarily produce immediate results like new goods or service to the mankind. Science, of course, has no mandate to be useful in daily life, if, we do not take such myopic view, but many of the technological and social changes that revolutionized our lives have the off shoots of the fundamental discoveries of science by the explorers, whose one and only one motivation was to understand the world around them better. This curiositytriggered voyages of discoveries across all scientific disciplines have delivered increased life-expectancy, intercontinental air travel, modern telecommunication tech-space, freedom from drudgery of subsistence firming and a sweeping, inspiring and humbling vision of our place within an infinite ocean of stars. But these are all in a sense spin offs. We explore knowledge, we are curious to know better and in more finer details without any complacency, not because we wish to develop grand views of reality or better widgets.

Quantum theory is perhaps the prime example of how the infinitely abstract concept can breed potentially useful things or explain phenomena better. Esoteric can become profoundly useful. Esoteric because it describes that a particle really can be in several places in the space at once and moves from one place to another by exploring the entire Universe simultaneously or say a cat can be dead at the same time alive! Useful because understanding the smallest building blocks underpins the understanding of everything else. This claims boarders on the hubristic, because the world is filled with diverse and complex phenomena. Notwithstanding the complexity, we understand now that every thing is constructed out of handful tiny particles that move around following the rules of quantum theory. The rules are few and doesn't require a library to accommodate. The summarized rules of the quantum theory

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can be written by hand on the back of an envelop and that is the bewildering mystery by itself.

Although the basic rules of the game are pretty simple, their consequences are not necessarily easy to calculate. Our daily experience of the world is dominated by the relationships between vast collection of many trillions of atoms, and to try to derive the behavior of plants or people from the first principle would be folly. While admitting this fact that this does not diminish the basic point – all phenomena really are underpinned by quantum physics of tiny particles.

Let us consider right at this moment, you are holding this journal in your hand. What you are holding are actually papers, the crushed pulps of the dead tree. Trees alive are like machines able to take supply of atoms and molecules, convert and use to sustain the plant. They can break the molecules, rearrange them with a grand design, called molecular structure into cooperating colonies composed of many trillions of individual parts. They do this using the molecule called, chlorophyll, composed of several hundreds of carbon, hydrogen and oxygen atoms twisted into a beautiful shape called porphyrin rings with few magnesium and nitrogen atoms bolted on. This assembly of atoms is able to capture the light that has travelled through the space 93 million miles far from our star, from a nuclear furnace of a million earths and transfer that energy into the heart of cells, where it is cooked to produce molecules like mono, di and poly saccharides and much needed lifeenriching oxygen, just by absorbing carbon dioxide from air and pumping water from the soil. It is these polysaccharides that they synthesize, forms now as building block to constitute the massive super structural chains that we call as a tree. The journal that is in your hand contains all these tiny particles. This is indeed fascinating!

We can read the journal and understand the word because our eyes can capture the scattered light from the Journal causing a temporal twist of another set of molecules present in rod cells of the retina called, trans-Retinal which are present as prosthetic group in rhodopsin and goes into conformational change to its geometric isomer cis-retinal, the halo protein of rhodopsin with which the retinal is attached covalently, alter its folding pattern, that in turn opens the sluice gate, triggering electrical impulses which are carried forward through a complicated web of neuron circuit to the brain, which analyze the signals thus arrived, recalls the memory, align each puzzle piece of mental picture of each word to form the total picture that is described in a sentence, since each word that we know of, produces some kind of mental picture in our brain, failing which the word carries no meaning at all. Brain is the most complicated structure in the Universe that we know of. We thus can see that all these are the game of the tiny diverse particle of molecules and their interactions with energy. Notwithstanding the fact that our everyday experience is only due to the interaction of atoms or molecules with energy. However, no molecule thus forms are static in nature, they dance continuously in complicated rhythms. The molecules are also composed by assembling atoms with a predetermined pattern that makes them functional. Even with such diverse molecules, the atoms that constitute them are themselves composed of only three different kind of fundamental particles – electron, proton and neutron which are again composed of further tiny particles quarks, only six in kinds, in various combinations. Underpinning all these is the objective focus of quantum theory.

The picture of the universe we inhibit, as revealed by modern physics, is therefore, one of underlying simplicity; elegant phenomena dance away out of sight and the diversity of the macroscopic world emerges. This is the crowning glory of the discovery of the modern science; reduction of tremendous complexity in the world, human included, to a description of the behavior of just handful number of tiny subatomic particles and the four forces that act between them. The strong and weak nuclear forces that operate deep into the nucleus of atoms comprising only protons and neutrons and the electromagnetic force that constitute the final atom with specific arrangements of electrons in them at different states and in different strata are the focus of the quantum theory. Only gravity the weakest force amongst the four siblings does not at the present moment have a satisfactory theory, but attempts are going on to combine quantum theory (the theory that describes behavior of tiny particles) with gravitational theory (the theory that describes the behavior of massive particle) through out the world by the theoretical physicists.

How does quantum theory stand out of the lot? Firstly, the idea that the particle has a definite location and definite speed is no longer allowed; that is wrong. To give an example of how wrong the classical physics is, there is a rule in quantum theory that



says one cannot know both where something is and how fast it is moving. This rule is the explanation of the mysterious paradox: if, atoms are made out of plus and minus charges, why don't minus charges sits just on the top of the plus charges (after all they attract each other) and get so close to completely cancel them out? Why are the atoms so big? Why is the nucleus at the center with the electrons around it? It was initially thought that the nucleus was so big; but no, nucleus is so small indeed. An atom has a diameter in the range of 10⁻⁸ cm; while the nucleus 10^-13 cm. if, we wish to see the nucleus, then we have to magnify the atom until it was a size of a hall, then the nucleus would be just a bare speck of dust that you can just see with your eye occupying at the center of the volume of the hall but very nearly all the weight of the atom is in that infinitesimal nucleus. What keeps the electron from simply falling in? It is this principle, if, they were to be found in that bare speck of dust, we would know their position precisely to that extent and the uncertainty principle would then require that they have a very large (but uncertain) momentum; that is the kinetic energy. With this large kinetic energy, they would break away from the nucleus. So, they make a compromise: they leave themselves a little room for this uncertainty and then jiggle around with a certain amount of minimum motion in accordance to the rule. The second interesting departure is, it is not possible to predict precisely what would happen in any circumstances. For example, it is possible to arrange an atom which is ready to emit light, and it is possible to measure by picking up photon particle. However, it is impossible to predict when it would emit. The Nature behaves in such a mysterious way that it is fundamentally impossible to make a precise prediction of exactly what would happen in a given experiment. This is horrible thing. Let us take a crude analogy. In a cricket match we know Birat Kohli is set to deliver a big hit, but it is impossible, under normal circumstances, to accurately predict when or which ball he would hit to cross the boundary! Philosophers say that it is fundamental requisite of science that whenever, wherever you set up the same condition, the same thing must happen. This is simply not true; it is not a fundamental condition of physics. The fact is that same thing does not happen that we can only find an average, statistically, as to what happen. One of the consequences of understanding of quantum theory is that the things that we used to consider as wave also behave as particle and particle consequently also behave as wave. So, quantum theory unifies the idea of wave, particle and field, all into one.

The classical physics consider that in observation of any experiments the instrument used remain invariant towards the observation, which quantum theory reviews and said just the opposite that the Instrument does interfere with the property of the quantum particle set under observation.

On the Shoulder of the Giants : The seeds of crystallization of the unseen world and deciphering the concealed mysteries of the tiny particle was sown by Ernest Rutherford in 1911, when to the utter surprise of many, he discovered that the entire mass and the positive charge of the tiny atom rests in its nucleus and the electrons stays far away from the nucleus. The space in between nucleus and the far distant electron are really empty. Rutherford noted the problem that all atoms formed at the same time should last for a definite time interval. However, the observed transformation indicated guite contrary. It suggested that the lifetime of an atom can embrace any value between zero and infinity. This randomness in microcosmos generated a shockwave indicating the ending of applicability of deterministic theories in the world of tiny particles. Furthermore, if, we know very clearly the cause and effect of every events, we can be successful predicting what would happen in another set of conditions. Melting down of this predictability is one of the most important revolutionary aspects of the quantum theory. It deals with probability, rather than certainty, not because we lack absolute knowledge, but because some aspects of Nature are, at their very heart, governed by the laws of chance! It is a chancy, chancy and chancy world of tiny particles. So, we cannot accurately predict when a particular atom would decay. The radioactive decay was the first encounter of scientists with probability theory, the dice of the Nature.

Rutherford's adaptation of planetary concept invoked several contradictions because it was established much before that if, the electrons move in curved path, it would radiate energy. Henrich Hertz in 1887 developed radio transmitter, where the electrons were set to jiggle around and as a result radio waves set in and before Rutherford discovered atomic nucleus, commercial Radio stations were commissioned and started sending radio signals across Atlantic from Ireland to Canada. But the negatively charged electrons can never remain static to offset the coulombic attraction of positively charged atomic nucleus and therefore, they must vibrate/orbit round the nucleus or change direction as a function of time. Hence electron in the

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atom should loose energy and fall back to the nucleus in a spiral path and both the proton and electron should annihilate each other within a short span of time. So, it seemed there is a barrier to proceed further to know how the tiny particles like proton, electron, neutron behaves within the atom.

German Physicists have a great contribution in development of the theory. Electrical incandescent lamps were commercially developed by Germany by evacuating glass bulb and introducing filaments in it. When electricity passes through the filaments it becomes hot and started glowing, radiating light. Germany wanted to be the best in Lamp production because it has a huge demand in the International market. A large number of physicists were commissioned to find out the theoretical understanding on the inner mechanism the relationship between the heat and light that they produce so that if, some quantified relationship becomes available, using that, the best light source can be produced. The main focus was why an atom while heated, emits light ?

A similar inexplicable phenomenon was the lights emit while atoms are heated. As back as 1853, the Swedish scientist Anders Jonas Angstrom discharged a spark through a tube and analyzed the emitted light. He assumed since this exactly happens in Sun, therefore, he should obtain white light similar to solar radiation and the night of the city will be like day in terms of illumination. To his disappointment he got only three distinct colors of light – violet, blue-green and red, like a partial rainbow with three pure narrow arcs. It soon followed that each element in the gaseous phase emits a distinct and novel bar code of colors. This certainly was a tool for detecting element composition but the result was no where near the target! Why was this profusion of colored lines? For over sixty years the science of emission spectroscopy, as it is known today, had been simultaneously observational triumph and a theoretical wasteland. The observation is still used mostly in fireworks manufacture during celebration still today anywhere in the earth. Just think the tragedy for a while!

Coming back to fulfilment of the German wishful aim to lead in electric bulb making came to observational hell of a lot of experiments, analysis and collection a myriad of data on the intensity of the emitted light as against the wavelength at various temperature of a black-body. This is most lovingly called as black-body radiation. Though there is no perfect black-body, yet the space inside a hallow metallic body with a small hole can be considered as a black-body. Several years of observation by several scientists through out the world noted certain common interesting observation and pile of data of the emission spectrum from black-body. Let us site a common day-to-day example, consider the sequence of the materials composed of different molecules and atoms like a) cigarette ends, b) burning log c) candle light d) incandescent lamp, e) LPG and f) electrical arc welding. Though they are composed of many different kind of molecules and atoms in it, three things are common 1) they all emits light or radiations, 2) they are essentially hot at the spot from where the light is emitted and 3) as the temperature increases, the maximum wavelength shifts towards higher energy (blue shift, as it is called in spectroscopy), which otherwise means lower wavelength. Recalling red, yellow, yellow, greenish yellow, blue and finally sparkling white respectively from all those above organic and inorganic materials.

Very similar observation was noted from the black-body radiation with few additional 1) the radiation spectrum depends only on temperature and at the same temperature the spectrum is the same irrespective of the atomic composition of the black-body. 2) it is independent of the size and the shape of the black-body or the diameter of the hole in it, 3) maximum wavelength shifts towards lower wavelength as the temperature is raised, 4) the spectral band width increases as the temperature increases.

As said earlier from the myriad data of the spectral composition of black-body radiation at various temperature was piled up and nobody knows what it speaks about! It is like expedition in a deserted jungle, where by excavation you discovered some stone inscription in some language. You are quite sure that it is telling something of historical importance, but unable to decode. The German physicist from the field of classical thermodynamics set in to solve the puzzle theoretically, which challenged to the practical physicist concerning black-body radiation. He was Wien. He predicted in 1896 that the radiation energy will vary directly with the fourth power of the absolute temperature. He has established a total formula to account for black-body radiation, which is called as Wien's Radiation Law. But when the black-body radiation experimental data was plotted with the guidance of Wien's Radiation Law it mapped quite accurately the shorter wavelength region of the spectra but completely disagreed in the longer wavelength region. He





had derived the formula based on classical thermodynamics considering hollow enclosure of the black-body as resonators of molecular dimensions with a postulation that the frequency of emission is proportional to the kinetic energy of the resonator.

Sixteen years passed by then in vein attempt to map the other half. In 1900 Lord Raleigh another exponent of classical thermodynamics applied the principle of equipartition of energy to the electromagnetic vibration and derived a mathematical formula. When to map with the experimental data the formula not only did the reverse i.e., agreeing in the longer wavelength region and disagreeing in the shorter wavelength region but also predicted that in the shorter wavelength region the emitted energy can be unbound. That means otherwise, if we start continuously heating a log, it will emit visible, ultraviolet, far ultraviolet, X ray, gamma ray, cosmic ray and you are no more in the earth. This horrible outcome of the prediction of Raleigh-Jean's Law has been termed by the panic-stricken the then physicist as "Ultraviolet Catastrophe".

In order to explain the distribution energy in the spectrum of the black-body Max Planck, another great exponent of classical thermodynamics in Germany by way of interpolation of Wien's Radiation Law and Raleigh-Jean's Law constructed new formula in 1900. This correctly mapped the black-body radiation spectral data in the entire range of wavelength. In order to put the formula right, Max Planck had to postulate quite abruptly and much to his own disappointment that a simple harmonic oscillator (every molecular resonator in this case), cannot have any arbitrary value of energy but only discrete energy or its principle multiple. That is, he revolutionized the concept with a sharp departure from classical physics, which permits for such simple harmonic oscillator to have any energy value in continuum. But Planck conceptualized that as if, energy resides in the form of an envelop having fixed energy in it. Either the emitting body can eject one or two or three.... such packets every time but not continuously as an unbroken chain of energy. This discrete package of energy Planck termed as quanta. Hardly Max Plank realized that he has obtained the hidden key from the Nature to decipher her code to a much larger extent, larger than his life. Appropriately Max Planck is called as the father of Quantum Theory.

Einstein in 1905, five years after Planck's hypothesis applied his conceptual brain child to prove that not only in the case of

emission of radiation by an atom, but during absorption of radiation too, atoms also absorb discrete energy packet. He called these packets of light particles as photon. Einstein successfully explained theoretically photoelectric effect, whose puzzles could not be accounted by the classical physics. Soon after that the landline of a different kind of physics departing from deterministic classical counterpart, became hazily observable to understand the tricks of Nature better and for the first time the limitations of all encompassing, omni potential and deterministic classical physical doctrine and dogma came under rigorous scrutiny. Max Planck was suffering from his guilty consciousness. Was he not responsible to kill the classical thermodynamics just to solve a very special case and an extraordinary postulation that he was forced by himself to make in solving a special mystery? Einstein with his theoretical assumption when succeeded in explaining the experimental puzzles of photoelectric effect completely, went to Max Planck to convince him that his postulation is bound to open many lock gates in future, which could not happen if, his very special postulation become untrue. Max Planck was not convinced and possibly the world could not get much from Planck thereafter. This is the most irony of science. The celebrated father of the quantum theory disowned his credit and the brain child both. Both Max Planck and Einstein were awarded Nobel Prize in Physics.

Another unexplained mystery evolved simultaneously which is known as Hydrogen Line Spectra. The Sun acts as a homogeneous fusion nuclear reactor. By nuclear fusion it produces Helium from Hydrogen with releasing avalanche of high energy (very similar like hydrogen bomb) and trillion trillion trillion of such fusion is taking place over there causing the surface temperature of the Sun to reach at 6,000 K. How do we know? Who has measured and with which thermometer on the solar surface? These are all valid questions. The maximum wavelength that falls on the surface of the earth from the sun is 550 nm. If, we put this value in Planck's Black-body Radiation Law we can solve for the temperature of the Black-body in this case, the Sun. This comes out as close to 6,000 K. The solar radiation reaching the earth were resolved into spectral wavelengths and the wavelengths were measured. One interesting thing observed that unlike in black-body radiation where the emission spectra was in continuum, hydrogen spectra appeared as vertical discrete lines, hence, it was called hydrogen

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line spectra. Many scientists all over the globe were quite addicted to resolve and measure the various series of hydrogen line spectra, without knowing what is it due to. This phenomenon offered goose bump but the mission remained unaccomplished. Again, the development of quantum theory came to a temporal hibernation.

The Dreams that Stuff is Made of : In 1912, fascinated by the riddles of atomic structure, the curiosity-triggered Danish physicist Niels Bohr came to Manchester to meet Rutherford. Obviously, Rutherford being an Avant Garde assigned young Dane, Niels Bohr, to solve the mysteries of the Hydrogen Line Spectra. Bohr being adapted to Rutherford's school first took his concept of nucleus as it was. Then just mathematically he derived equation balancing centrifugal force of electron owing to its orbital motion with the centripetal force due to coulombic attraction between the positively charged nucleus and the orbiting electron in the Hydrogen atomic model. This is the simplest of all elements having just one proton with one positive charge and one orbiting electron with one negative charge. In this case he has to postulate two things 1) electrons has many stationary states and electron so long as it will orbit in a stationary state is prohibited to radiate energy. He had to postulate this in order to inhibit the electron-proton annihilation because of loss of energy while orbiting in curved path as explained earlier and also by absorbing external electromagnetic radiation envelop (quanta) of matching frequency electron can jump from lower energy stationary state to higher energy stationary state (similar consideration that Einstein applied to explain photoelectron emission) and vice versa emitting energy envelop to come down from upper energy state to lower energy state and 2) angular momentum of electron orbiting the nucleus can not take any value but must be a principal integer of Dirac's constant.

With these postulations Bohr succeeded to explain accurately not only a) the atomic structure but b) the size of Hydrogen atom (r = 0.53 Angstrom) and c) the first ionization energy of hydrogen atom (- 13.6 eV). As a further extension his theory was instrumental in accurately determination of the Rydberg's constant associated theoretically with the explanation of Hydrogen line spectra. He has also shown by extrapolation of his theory that the so called Balmer series is the information pack of descending of electron from orbits higher than quantum No 2 to quantum no 2, similarly Lyman series are the information of descending electron from n > 1 to n = 1, while Paschen series from n > 3 to n = 3, Bracket series from n > 4 to n = 4 and Pfound series from n > 5 to n = 5. All these were great indeed! Niels Bohr thus successfully explained the Angstrom's observation – they were attributed to electron hopping down from the fifth orbit to second orbit emitting violet colored light, from fourth orbit down to second orbit emitting blue-green light and from third orbit to second orbit emitting red colored light. Thus, all belong to Balmer series.

But Bohr was criticized badly. Heisenberg said to his postulates, "perhaps it is a madness", Pauli said, "I would give up physics and prefer to be a clown in the circus if, any of the Bohr's postulate comes out to be true." They themselves are the giants of quantum theory, but it was difficult for them to understand Bohr at that time. But, much later Heisenberg with his muchcelebrated Uncertainty Principle established Bohr's second postulate. Similarly, other celebrated scientists both Schrodinger and Heisenberg gave cognizance to Bohr's first postulate by establishing time independent possession of electron in certain states (called as stationary state by Bohr) -Schrodinger & Heisenberg by wave mechanics and matrix mechanics (which were their brain-child too) respectively. The important message that they left to the mankind, therefore, resistance to accept the changes is the common nature of human and even those with monster minds are no exception too (on the lighter vein)! It is undoubtedly true that Bohr was misjudged and underestimated by the celebrated scientists then.

Though Bohr's theory gave ample clarity to conceptualize the structure of atom, yet, it was unable to explain why shouldn't electron spiral back to the nucleus when radio transmitter does work or much later undisputed Maxwell's equations does predict that it should? Similarly, the second postulate why should one impose such restrictions on the angular momentum to the orbiting electrons? Why should the atomic orbits be quantized ?

Though Bohr did not quite manage to extend his atomic model beyond Hydrogen, the ideas he introduced could be extended to other atoms. In particular one may presuppose that the atoms of each element have a unique set of orbits then only they will emit only light of certain wavelengths while jumping down from

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higher orbit to lower. That means every element thus can be known from the set of wave length that they emit. These set of wavelengths associated with each atom is like the undisputed finger print of the atoms. Astronomer took this idea emerging from half-baked theory of Bohr. Resolving and analyzing the wavelength emitted by the distant stars they started making qualitative assessments what kind and how many kinds of atoms are the constituent of a particular star under study. This is indeed interesting!

Let us recap the contesting ideas that made the earlier understanding of quantum theory no less paradoxical than the original paradoxes themselves. We have accumulated quite a good volume of information, knowledge about the matter, energy and a reasonable mass of strange results at the very beginning of the development of quantum theory. Planck, Einstein introduced the image of light as corpuscular having envelop of quantized energy; Maxwell, on the other hand projected undisputedly light as wave. Had it not been so, we could not take into account like dispersion, interference of light. Rutherford and Bohr proposed model of electron and rule that governs the transition of electron from one orbit to another, but the way electron behave inside the atom remain still mysterious. The diverse phenomena collectively known as radioactivity, in which atom spontaneously split appear for no discernable reason, remained a mystery, not least because it introduced disturbingly random element in physics. But there is no doubt that the human made a first footstep into the quantum jungle full of riddles, where anagrams and conundrums play such dominating roles challenging academic perspicacity quite as much as the unscholarly naiveté.

First step towards a consistent, unified answers to these bewildering questions are credited to another great German physicist – Werner Heisenberg. In July of 1925, Heisenberg published a paper throwing out old hotchpotch of ideas and half-baked theories, including Bohr's atomic model and ushered in an entirely new approach to physics. He very boldly put forward the idea that the job of quantum theory should be to predict directly the observable things, such as color of the light emitted from an excited Hydrogen atom. It should not be expected to provide some kind of satisfying mental picture for the internal working of the atom, because this is not necessary and, in many cases, not possible at all. Thus, in one fell swoop, Heisenberg removed the conceit that workings of Nature should necessarily accord with common sense. This is to say that a theory of subatomic world shouldn't be expected to accord with the everyday experience when it comes to describing the motion of a large objects, like tennis ball or an aircraft. We should be prepared to completely abandon the prejudice that small thing should behave in a manner like miniature version of a large thing, if, this is what our observations dictate. So, Heisenberg demanded a radical change in perception on how the particle should behave under the scanner of quantum theory.

The famous Heisenberg's Uncertainty Principle was a breathtaking departure and a death nail to the determinism of classical physics. Its rule is most simple as any one may think of. The Heisenberg's Uncertainty Principle states that no matter how, you cannot measure with absolute precision two dynamic variables of quantum particle like position and momentum duo or energy and time duo simultaneously. The product of uncertainty of measurement of both of them will be at best equal to the Dirac's constant. That means if, we set to measure position accurately, its momentum will be high but inaccurate or vice versa. It is to be understood very clearly that it is not the limitation of either science or technology of measurement. It is the fundamental law of Nature. There seems to exist a natural ban to completely strip the Nature off her mysteries. Nature was mysterious, is mysterious and will remain forever mysterious too. It is like a hide and seek game that can allowed to be played with her.

Taking a crude analogy, let us suppose we have gone to a quantum forest where tigers are the quantum particles. The moment we try to aim the nozzle of the gun, the tiger gains enormous velocity and completely off the forest. By aiming the gun towards the tiger means in another way fixing the position precisely and thus this result is obvious in full agreement of the Uncertainty Principle.

Now, coming to the unanswered half-baked Bohr's theory, we know we can draw the path of a moving object provided we can measure the velocity and the position simultaneously. Say, for constructing the path of a projectile or any terrestrial massive object like the planets orbiting the Sun etc. Heisenberg questioned how can Bohr draw the orbit of electron and equate





balancing centrifugal force with centripetal force when both position of electron and momentum (read velocity) cannot be determined accurately and simultaneously?

Furthermore, on the question arbitrarily imposing ban on emitting radiation by orbiting electrons in stationery orbits in order to prevent obvious collapse of atoms was not required. The atomic diameter is in the order of 10⁻⁸ cm while that of nucleus 10⁻¹⁵ cm. So, if due to emitting radiation for travelling in curved path electron would sit on the top of the atomic nucleus, its uncertainty with regard to position measurement would reduce by a factor 10⁵ that means minimum velocity of the electron on the top of the nucleus would be 0.1 Million times more than that in the previous distance. With such an enormous rise in kinetic energy the electron would break away and escape from the atom. Simply this does not happen and therefore, there is hardly any probability to find the electron at the nucleus. Surprisingly by application of Heisenberg's Uncertainty Principle, it can be worked out that the first ionization energy of hydrogen atom is - 13.6 eV. This is in complete agreement with Bohr's model.

In 1927, a simple experiment was conducted at the Bell Laboratory by Clinton Davisson and Lester Germer they studied the intensity of scattering a homogeneous beam of electron of adjustable speed upon a Nickel crystal and measured it as a function of direction. The much-improvised double slit experiment showed guite clearly that the electron behaves as much as particle and so much as wave, otherwise interference pattern like light with alternative light band and dark band at the detector screen were never to be seen. So, there is another difficulty in forming a mental picture. Wave and particles in classical physics have been always considered as two different entities. Now the experiment suggests that for electrons, photons (or in fact for quantum particles) behave sometimes as particles and at some other time as wave. They are in actual not two different entities, rather they are like both sides of the same coin. Richard Phillip Feynman commented, "they (subatomic particles) do not behave like waves, they do not behave like particles, they do not behave like clouds or Billiard balls or weight on the springs or anything that you have ever seen". Let's now build a model to understand how do they behave!

By and large Max Planck, Albert Einstein, Rutherford, Niels Bohr and Compton considered electron mostly as particle. But that's not the absolute description. Both light and quantum particles are wave and particle dual in nature. Depending on the condition and the energy in them, they sometimes behave as wave, sometimes as particle.

The double slit experiment showed strange conclusions that a) the electrons passing through the slits interfere themselves and b) the instrument chosen to conduct the experiment also interferes and they do not play a passive role. If, we take an absolute assumption in the double slit experiment that the particles are wave only, the explanation becomes simpler in the sense, we can easily infer that the interference pattern observed in the screen is due to the wave nature of the particle. But the explanation becomes difficult, if, we take it from the view point of particle nature.

Let us put it in another way. Let's try to assess, what could likely to happen, if, we change the source of the double slit experiment from cathode ray tube ejecting electrons to a) a machine gun ejecting bullets and b) a lamp ejecting light. As in the case of electron, we did observe the presence of most of the electrons are right through the slits but there are interference pattern also forming alternating dark and light bands. The same pattern would have observed, if, instead of cathode ray tube, we could replace a lamp. But when we shoot bullets through the double slit, there is no interference pattern at all. Now, let us quickly summarize the results of the three experiments 1) with light source, 2) with machine gun and 3) with cathode ray tube. In the case of the light source, the wave nature of the light is predominant hence it is easy to understand. In the case of Machine gun, the ejected bullets from it has predominance of particle nature hence there is no interference. But in the case of cathode ray tube, again the experiment shows interference pattern indicating the wave nature of the electrons ejected from the cathode tube and passing through either one slit or sometimes the same electron through both the slits.

Here lies the obvious conflict, how can we explain this? How can the same electron pass through both the slits at the same time? This is, therefore, offering a challenge to build a theory such that which would be able to account for how the pointlike particle can indeed spread out. This is not as impossible as





it sounds. The objection arises from our mental picture and correlation of our mind from daily experience. This thing had been swept out by the Heisenberg, who said simply to focus on the experimental result and see it from discretely not corelating with our daily experience because electrons and its behavior is not in the ambit of our daily experience. The explanation becomes reasonable, though difficult to comprehend, if, we let any single quantum particle be present in many places at once. Of course, it may sound still impossible, the proposition that a particle should be in many places at once is actually a clear statement, even if, it sounds silly enough. From now and onwards quantum theory argues us to accept that this counterintuitive, spread-out-vet-point-like particle as quantum particle. With this 'a particle can be more than one place at once' proposal, we are moving away from our everyday experience into an unchartered territory. However, it is a new mandate of the quantum theory that, for science it is not a mandate that either the result or the inference must necessarily be coaxial with our daily experience. One of the major obstacles in understanding quantum theory is the confusions that it creates of this kind can endanger. It is better to unlearn completely and relearn quantum theory afresh.

To avoid this confusion, we should follow Heisenberg and learn to feel comfortable with the views of the world that runs counter to tangible experience. Feeling, 'uncomfortable' can be mistaken for, 'confusion', as very often we continue to understand anything from the experiences that we gather from our daily life. It is the resistance to new ideas that actually gives birth to the confusion itself, because real world games do not necessarily coincide with our daily experience.

A good way to begin is to think carefully about double slit experiment for water waves. Our aim will be to work out just what it is about waves that causes interference pattern. We should then make sure that our quantum theory is capable to encapsulating this behavior, so that we can have a reasonable chance of explaining the result of the double slit experiment for electron better and coherent with wave nature.

There are two reasons why water wave journeying through two slits can interfere with themselves. The first is that the wave travels through both the slits at once, creating two new wave fronts that head off and mixes together before it reaches the detecting screen. In this process of mixing when the phase of each waves is correctly aligned their amplitude is amplified and when opposite it is attenuated or even destroyed. We have no problem to account for by standing on a sea shore and observing one long sea wave rolling to the shore and crushing on to a beach. It is all of sea water; an extended, travelling thing. We are going to need to decide how to visualize our quantum particles as 'an extended travelling thing'.

The second reason what has been already said, that the two new waves exiting through the two slits and heading out are able either to add or to subtract from each other depending on the mode of mixing. This ability for two waves to interfere is clearly crucial in explaining the interference pattern. The extreme case is when the peak of one wave coincide with the trough of another. This cancels out the both. So, we have no choice left other than to allow our electron beams passing through double slits to interfere with each other. It become consistent, if, we consider our electron as pure wave, which unfortunately they are not and a single electron particle should be permitted to remain in many positions at once, if, we consider them as purely particle, which they are obviously not. They are neither a complete wave nor as completely particle - they are dual in nature. Mixing both these concepts becomes troublesome because we do feel uncomfortable. This gives rise a mistaken view of confusion since it cannot be mapped with our everyday experience. This concept itself by its own right and merit – evocative, bewildering yet fascinating but difficult to comprehend; the moment we try to look through the prism of our everyday experience.

The French theoretical physicist Prince Louis de Broglie in 1924 gave a complete shape in the relationship of wave-particle duality. He has established theoretically that the momentum of the quantum particle times its wavelength would equal Planck's constant. It is other way to say that the momentum which is associated with particle character varies inversely with the wave length which is an attribute of wave character. This means higher the wave length is, lower would be the momentum and vice versa. Therefore, conceptually all the quantum particles are dual in character. Depending on the kind of experiment and the energy associated some times the wave character predominates over the particle character in other times the particle character dominates over wave character. A note of caution was also

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given that in no case in any experiment it can be shown that they bear both these characters. So, the riddles were solved raising a further question. This theory has been aptly proved in the interference observed in Davisson and Germer's experiment and further corroborated by famous double-slit experiment. De Broglie was awarded a Nobel prize too.

If, the electrons are viewed to be dual in character, as indeed they are, what would happen, if, we wish its wave character to fit in the atomic model as proposed by Niels Bohr. Broglie stated that, if, we consider electron as complete wave the orbit of the electron as conceived by Bohr must adopt full wave lengths means integral of wave lengths. Otherwise, if they are fractional, there ought to be interference and possibility of disappearance of electron or collapse of atomic structure there by, cannot be over ruled. This simple assumption led to establish the much-needed support to the Bohr's second postulate that the angular momentum of the electron should be integral of Dirac's constant.

Now coming back to the Heisenberg's uncertainty principle, if, we cannot measure the momentum of electron and position both simultaneously and accurately; how can we describe the structure of the atom or its behavior, which is the kernel of the formation of the diverse universe with galaxies, nebulae, stars, satellites, meteorites, dwarf, black holes, water, plant, animal, microbes, mountain, sea, ocean etc.?

To this Heisenberg stated we can only describe or predict in terms of probability and not in definite terms. By application of his theory Heisenberg correctly calculated the first ionization energy of the Hydrogen atom and Io, it came out to be exactly the same as calculated by Niels Bohr in his atomic model. So, once thought upon a half-backed theory, has some recognition and material fact concealed in it!

In January 1926, an Austrian Physicist Erwin Schrodinger published a paper where he applied classical wave mechanics, tailored made to fit in quantum theory and that became later on known as Schrodinger's equation. What are the basic assumptions that he had to take into consideration to tailor make? In classical mechanics, a wave equation is a partial second order equation in space and time. Solutions to this equation lead us to understand the wave disturbance in the medium of propagation of the wave classically. In order to fit into the quantum theory Schrodinger had to built in some of these important features are :

- a) the equation of wave motion of classical mechanics can be transformed into wave equation, if (if, and only if), it conforms with the wave properties of the matter in agreement of de Broglie's hypothesis.
- A complex variable quantity, called the wave function, is assumed to represent a plane simple harmonic wave associated with a free particle, and the classical expression for the total energy is used.
- c) A particle in the given position and at given time is represented by a wave packet which is obtained by superposition of a group of plane waves of nearly same wave lengths, which interfere destructively everywhere except at the wave packet, and the classical expression of total energy is used and
- d) In the classical expression for the total energy of a particle, the dynamical quantities are replaced by their corresponding operators and these operators are allowed to operate on the wave functions.

Schrodinger successfully developed wave equation especially crafted to fit into quantum theory. With this development the quantum theory no more remained abstract and qualitative but in stead it become measurable and quantitative. Being a second order partial differential equation, the wave equation, herein after will be called as Schrodinger's equation, do not give a unique solution, rather several solutions. So, the pragmatic way to accept only those solutions which physically satisfies the ethos of quantum theory. That means Schrodinger restricted those solutions to be valid, which satisfied certain obvious preset conditions – called eigen conditions which are as follows

i) the wave function must be single-valued and real (devoid of imaginary numbers).

•

- ii) both the wave function and its first derivative must be continuous.
- iii) The wave function must go to zero at infinity. This is necessary condition, if, the atoms are to remain finite.
- iv) the integral of the complex conjugate multiple of wave function times a small volume element should be associated with the probability of finding electron at the given space and time and last but not the least,



v) The probability of finding electron summed over all space must be one, which is called normalization.

Transformation of Schrodinger's wave equation from Cartesian coordinate to polar coordinate and solving them keeping testing through the eigen conditions, Schrodinger was able to describe the occupation and behavior of multi electrons in various orbits with certain fixed rules. There too keeping the uncertainty into its due share. By separating time variable and space variable time independent Schrodinger's equation was also possible to solve uniquely. Consequent upon this it can be stated that an electron can remain in a particular energy state for an indefinite time, unless being perturbed by outside radiation. This is in a way recognition of the Bohr's first postulate, just 14 years after his postulations, which he postulated abruptly then to account for the origin of Balmer series in Hydrogen line spectra in 1912! Such exciting things happen in physics.

By letting angular momentum operator apply on the Schrodinger's equation, Schrodinger also obtained the eigen value of angular momentum of electron in the first orbit and concluded that it cannot take any value only discrete values of integral of Dirac's constant. Second postulate of Niels Bohr's half-baked theory was thus corroborated by both Schrodinger separately after nearly a decade of his proposed atomic model. Braced with Hund's rule of multiplicity and Pauli's Exclusion Principle with the solution of Schrodinger's equation it has now become possible to describe the behavior of electron inside an atom.

The another application of Schrodinger's wave equation is, if, the molecule is considered as a simple harmonic oscillator (which was in fact assumed by the great physicists with specialization in thermodynamics) like Wien, Raleigh-Jeans as well as Max Planck in solving black-body radiation, the zero point energy of that Simple Harmonic Oscillator cannot be zero rather ½ hv. That means such oscillator (read molecule) must always vibrate, irrespective of the ambience like temperature or thermodynamic state like solid, liquid or gas. Had it not been so then we could detect simultaneously and precisely the fixed position of quantum particles constituting them and simultaneously say that their momentum is zero, in violation of Heisenberg's Uncertainty Principle. The fact that electron cloud embracing the nucleus must necessarily vibrate, it is only the vibrational frequency that will increase, if the heat is applied from outside. The more the heat is, faster will they vibrate. So, since all matters are composed of atoms or molecules whether it is a cigarette, log wood, candle, incandescent lamp, LPG or Electrical Arc welding rod. When we apply heat, they absorb only matching frequency of Infra-Red radiational incident on them and get promoted to next higher quantum level and vibrate faster. Vibration means changing direction as a function of time. As the temperature is increased more rapidly the atoms in it will vibrate. Because in such rapid acceleration the charged particles within the atoms will now be subjected to, according to Maxwell's equation at some point of time, they will glow radiating electromagnetic radiation. Quantum theory states without any ambiguity that the condition can be created for atoms to glow but it is impossible to predict guite accurately the instant, when they would start emitting light.

Application of Schrodinger's equation is not confined within the water-tight compartment of physics only. It has a great application in chemistry too. Though in reality it is a wrong part to draw boundaries between any branches of science. It is only the perceptional difference that led us to believe so. Any fundamental theory concerning quantum theory must have wide application beyond the seemingly water tight compartments of knowledges. Without the Schrodinger's equation the understanding of molecular spectroscopy becomes obscure. The Particle-in-Box is not only a model to understand the different layers of energy and transition from one energy state to another, but it also explains how and why extension of conjugation (extension of alternating placement of single and double bonds) in polyenes stabilizes an organic molecule or why more the canonical structures of a molecule are, larger is the resonance stability. It is Schrodinger's equation that derives the valence bond theory or molecular orbital theory which not only describes the formation of molecules and the kind of bonds, their symmetry as well as relationship with stability, bond length and magnetism etc. We could not understand protein folding and the prime role that a partial double character of amide linkage of polypeptide chain plays to initiate and fix the macromolecular robust structure of proteins in Biology, which is the kernel of multiple specific function that a protein plays to sustain the life. Without the help of Schrodinger's wave equation, we could not comprehend the very intricate mechanism of transition of molecule too. Yes, external





electromagnetic radiation incident on the molecule causes various orders of perturbations to the molecule and that triggers for transition to calm down, so to say. Classical view points would surely be unable to change this view pattern

Conclusion : So, quantum theory is not merely a departure from classical theory. It is indeed much needed theory that opened many more technological advancements to change the life style, life expectancy. We shall site only few of them, development of electronics, computer, information technology, massive internet or world wide web communication, artificial intelligence, rechargeable cells, guantum computer, diagnostic equipment in health care like computer aided spectrophotometric test of pathological parameters, MRI, CT-Scan, controlled drug delivery system, equipment used in environmental and stem cell research, lesser guided surgical intervention etc. can never be in place, without the use of quantum theory at any case, if, we look very intricately. It is not only the excitement and climax enjoyed by the scientific giants, who were in the forefront to combat one challenge after another. The more they solved, more problems came to make a halt. It was they who laid down their life and passion to may be solve one puzzle piece. But when several such unquestionable puzzle pieces were combined together, we get a brilliant picture and promise both.

Taking these inputs in mind and in hand the engineers and Technologists set their skills to utilize them in designing the equipment or service that is at the disposal of every human across the globe. This is the very objective of scientific development. It is true hardly the individual inventor could understand that the potentiality of their discovery will reshape the world with tangible outcome one day and serve the human across the globe a great deal of service. They might not survive to see with their own eyes with joyful satisfaction what the victory would have given to them. But that's not important at this point to consider.

We shall only suffice it to say that the first application of quantum theory was made to explode nuclear fission in forming atomic bomb which destroyed Hiroshima and Nagasaki completely and most of the fore-runners were involved in developing it. Though with the same nuclear fission, but in a controlled or regulated manner, nuclear reactors were also made to produce bulk of electricity at a cheaper rate commissioned under the Presidency of Werner Heisenberg in Germany. Richard Phillip Feynman once commented, "we have only one key to open the gate of the heaven, but unfortunately, the same key opens the gate of the hell too."

It was written in a popular way without attaching any due importance to mathematical treatments, figures, graphs etc. – all of them can be substantiated from any text book of quantum mechanics. The author only wanted to create interest on this subject, which is popularly conceived as esoteric. If, the learner targets can find interest and conceive the philosophy more than the rudiment treatment, which was also one of the objectives of writing this paper, it would be a great satisfaction for him to consider mission successful. Only they have to realize and appreciate that quantum theory is not the contribution of one scientist in one fine morning, but over the period of 19th century step-by-step, layer-after-layer the theory was developed by painstaking and revolutionary original thoughts uninfluenced by the classical consideration. It is really over the shoulder of the giants, they dreamt how the staffs are made of!





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ILPA Corner_____

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Students Corner_

KNOW YOUR SHOE Part - 4

Mr. Shome Nath Ganguly Former Principal, Karnataka Institute of Leather Technology

NORWEGIAN WELTED CONSTRUCTION



Norwegian reverse welted construction is to some extend differs from original Good year welted. We discussed elaborately in the Good year welted construction how the welted shoe is being made with the help of welt + insole rib and sole. The bottom of this shoe is entirely attached with upper portion of the shoe by stitching with welt only. In Good year welted method we attached insole rib + Closed lasted upper + welt by stitching. The entire stitching is kept inside the shoe. You cannot see the stitching (joining of insole rib + upper + welt) after the bottom is attached. But in reverse welt or Norwegian welted construction you can see the inside attachment of welt stitching on the shoe. It is a variation of the welted construction in which welt (specially designed leather stripe, one side skived will be stitched) is sewn vertically to the side of the shoe or boot. As such the joining of this stitching of welt with insole rib & upper is visible vertically from outside of the shoe. The entire part of the welt sewn in this way is now out flanged. The reverse welt stitching is visible from outside. After completion of this shoe we can see two rows of stitching along the side of the shoe. One stitch is



Students Corner

vertically visible & the other one is horizontally. Vertically visible stitching is not visible in good year welted shoe construction.



Reverse Welt is attached with shoe in the following way.

- 1) Welt + Upper + Insole Rib (visible)
- 2) Welt + Out Sole (invisible)







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INDORE'S LEATHER TOYS MARKET IN SHAMBLES WITH NIL EXPORT



The Covid-19 pandemic has left the GI-tagged (geographical indication) leather toys of Indore in disarray with almost nil export since the beginning of the year raising worries for manufacturers.

Manufacturers of leather toys claimed to have not received single order since the pandemic reducing export to zero.

Leather toys manufacturer Suber Rampurwala said, "Leather toys market was anyway not doing well since past many years but the spread of Covid-19 has has shattered it. Post-Covid, we don't have any order for leather animals".

Manufacturers said the demand for leisure and items have dropped post-Covid-19 and leather toys being a decorative item, its market has lost its sheen.

Indore is famous in the international market for its life-size tanned leather animals with elephant, giraffe, horse, tiger and black panther being the most in demand. These leather toys are available in various sizes starting from six inches to life-size. A second generation manufacturer Surendra Singh Thakur, owner of a 60- year-old leather toys' unit said, "I have never seen such a slump in business.

Despite slow growth, the sale was continuing but since the beginning of this year, we have not shipped a single product." The United States and European countries are the major market of leather toys. Manufacturers said most of them used to export to the United States from Indore but have not received any order from bulk buyers since February.

Amidst the pandemic, a few manufacturers are also contemplating to opt for online platforms to sell products.

Thakur said, "Looking at the scenario, offline sales are looking difficult. We are now thinking of going online to sell our products to survive in the business." The association of leather toys manufacturers has pegged the turnover of leather toys from Indore close to Rs 10 crore.

Leather toys manufacturers are now pinning hopes on upcoming Christmas season to return to business and demanded a designing facility from the state government to boost the ailing sector. Manufacturers said they hope to receive some fresh orders by the end of August ahead of Christmas and for this they have already started preparations, getting supplies of raw materials and manpower.

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has 2 astonishing zip compartments on both sides to keep coins or money or other valuables.

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(Source : Times of India – 04/08/2020)

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Medlar presents to you this amazing looking leather briefcase bag that is suitable for both, men and women. This impeccable leather bag comes in dark brown color and is manufactured using synthetic leather. Along with this, the offered product comes with an adjustable shoulder cross-body sling strap and includes a 7-multicompartment with a laptop bag compartment with a velcro strap.

HAMMONDS FLYCATCHER 15.6 INCH GENUINE LEATHER LATEST DESIGN OFFICE MESSENGER LAPTOP ORGANIZER BAG (BROWN)





Get yourself this amazing leather briefcase from Hammonds Flycatcher that is gettable in brown color. This leather briefcase is well suited for storing a 15.6-inch laptop and comes with a main interior compartment with a front pocket (zipper) for extra security.

Moreover, this product is stitched using A-Okay leather, which further adds up to its retro and wild look

LEADERACHI WAX HUNTER LEATHER MUSKAT LAPTOP BRIEFCASE BAG



Purchase this exciting looking and strongly made leather briefcase bag from LEADERACHI. This product is made using the first-string 100% genuine leather and comes with 14" height x 16" width x 4" depth. In addition to this, the offered leather briefcase bag is double-stitched and riveted or reinforced with hidden nylon strapping. This briefcase has 1 main compartment sealed by a leather cover with Zipper closure, 1 padded laptop compartment inside, 1 secondary compartment in front, 1 zip pocket, and 2 smaller & separately attached compartments that are sealed by the leather cover with magnet closure, and 1 zip pocket on the back.

HYATT LEATHER ACCESSORIES EXPANDABLE 18 INCH MEN'S LEATHER BRIEFCASE OFFICE BAG WITH GOLDEN LOCK (BROWN)



HYATT Leather Accessories presents this stupendous looking leather briefcase for men. Available in brown color and in a $15 \times 18 \times 5$ dimension, the outer material of this product is stitched using top-notch leather while the inner area is made using Suede. With a capacity of 24 liters, this product can be expanded up to 2 inch or 5 cms. This leather briefcase comes with a golden 3-digit numerical combination lock.

THE CLOWNFISH ELEGANT 15.6 INCH FAUX LEATHER CHOCOLATE LAPTOP BRIEFCASE (CHOCOLATE BROWN)



Don't miss this elegant and stylish leather briefcase bag from Clownfish, which is made using the premium grade Vegan leather. The offered product is available in the chocolate brown color and comes with metal fittings that ensure its sturdiness and durability. Moreover, this leather briefcase can be expanded up to 3 cm to 6.5 cm. This product easily fits laptops up to 15.6 inches and comes in a 45 cms x 12 cms x 42 cms (LxWxH) dimension



(Source : International Leather Maker – 23/08/2020)



A Healthy Manufacturing Plant and Its Driving Mechanisms

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Abstract :

Among the characteristics of a company that shape corporate and therefore manufacturing strategy are its dominant orientation (market or product), pattern of diversification (product, market, or process), attitude toward growth (acceptance of low growth rate), and choice between competitive strategies (high profit margins versus high output volumes). Once the basic attitudes or priorities are established, the manufacturing arm of a company must arrange its structure and management so as to reinforce these corporate aims. Examining the extremes of "product-focused" and "processfocused" organizations, the authors illustrate the development of a "manufacturing mission" whereby the organization of manufacturing supports management's needs.

Manufacturing organizations tend to attract the attention of general managers the way airlines do: one only notices them when they're late, when ticket prices rise, or when there's a crash. When they are operating smoothly, they are almost invisible. But manufacturing is getting increasing attention from business managers who, only a few years ago, were preoccupied with marketing or financial matters.

Introduction :

The fact is that the great bulk of the assets used in most companies i.e. the capital invested, the people employed, and management time which are in the operations side of the business. This is true of both manufacturing and service organizations, in both the private and public sectors of our economy. These resources have to be deployed, coordinated, and managed in such a way that they strengthen the institution's purpose; if not, they will almost certainly cripple it. The problems and pressures facing manufacturing companies ultimately find their way to the factory floor, where managers have to deal with them through some sort of organizational structure. Unfortunately, this structure often is itself part of the problem. Moreover, problems in a corporation's manufacturing organization frequently surface at about the same time as problems in the rest of the company, and they surface in a variety of ways. For example:

- A fast-growing, high-technology company had quadrupled in size in a ten-year period. Its manufacturing organization was essentially the same at the end of that period as before, dominated by a powerful vice president for manufacturing and a strong central staff, despite the fact that its product line had broadened considerably, that the company was beginning to make many more of the components it formerly purchased, and that the number of plants had both increased and spread into four countries. A sluggishness and sense of lost direction began to afflict the manufacturing organization, as overhead and logistics costs soared.
- A conglomerate had put together a group of four major divisions that made sense in terms of their financial and marketing synergy. But these divisions' manufacturing organizations had little in common, little internal direction, and no overall coordination. The parent company was confronted with a series of major capital appropriation requests and had little understanding of either their absolute merits or the priorities that should be attached to them.
- A fast-growing company in a new industry had for a number of years operated in a seller's market, where competition was based on quality and service rather than price. Its manufacturing organization was highly decentralized and

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Article



adept at new product introduction and fast product mix changes. In the 1970s severe industry overcapacity and price competition caused corporate sales to level off and profit to decline for the first time in its history. Manufacturing efficiency and dependability clearly had to be improved, but there was fear of "upsetting the corporate culture" and "crippling the golden goose."

Why did these companies' manufacturing arms get into trouble? And to what extent were these problems the outgrowth of poorly designed organizational structures? In attempting an answer to these questions, we will begin with a review of the concepts of "manufacturing mission" and "manufacturing focus" that were first defined and explored in a series of articles by Wickham Skinner beginning in 1969.¹ These concepts, and the conclusions that flow logically from them, have since been polished, elaborated, and tested by him and a number of his colleagues in conjunction with various manufacturing companies over the past several years.

After this review we will evaluate the advantages and disadvantages of different approaches to organizing a company's manufacturing function and then apply our concepts to recommending the type of organizational design that is most appropriate for a given company. Finally, we will discuss the various kinds of growth that companies can experience and how these expectations should affect the organization of the manufacturing function.

Let us ponder upon possible factor for a healthy plant :

Once a suitable location of the plant has been decided upon, the next important issue is the design of the layout. Plant layout is the plan for arranging the physical facilities and manpower required to manufacture a product with the objective of utilizing them in an effective manner. Plant Layout is also known as facilities design. Plant layout constitutes planning of the amount of space required for all kind of activities in an industry, i.e., equipment, machinery, furniture and fittings, offices, rest rooms, warehouses etc. The primary objective of plant layout is to minimize the movement of men and materials in the plant. Designing a proper layout is important because it has a direct relationship with efficiency of operations and cost of production. A poorly designed layout will result in inefficiencies and losses throughout the existence of the plant. As Decisions regarding plant layout cannot be taken once and for all. Changes in process and techniques of production necessitate changes in plant layout. It is therefore important to design the layout in such a way that it is flexible to change.

Plant Layout is one of the most important factors for a new industrial enterprise, after deciding the location of the plant. It pertains to planning of the space available for all the activities and facilities associated with manufacturing with a view to enable the plant to function effectively. Plant layout includes the arrangement and location of work centres and various service centres like inspection, storage, and shipping within the factory building.

In the words of James Lundy, "Plant Layout identically involves the allocation of space and the arrangement of equipment in such a manner that overall operating costs are minimized".

Thus, development of a proper layout for a plant calls for a careful planning. Such a planning involves a consideration of the technical aspects of the machinery and equipment and processes of manufacture, etc. Management executives can benefit considerably by involving a highly qualified engineer while designing a plant layout. In this way, plant layout is a joint product of both the disciplines, namely, engineering and management.

Objectives of plant layout

The primary objective of plant layout is to maximize production at minimum cost. The layout should be designed in such a way that it is flexible to change according to new processes and production techniques. The layout should be able to satisfy the needs of all those who are associated with the production system such as workers, supervisors, managers etc., to fulfil the above goals, the plant layout should be designed with the following objectives:

- 1. Minimizing handling of materials.
- 2. Maintaining flexibility of operations.
- 3. Ensuring optimum utilization of men, materials, equipment and available space.
- 4. Achieving good work flow and avoiding accumulation of work.
- 5. Minimizing delays and bottlenecks in the production system.





- 6. Ensuring safety of workmen by minimizing and eliminating the chances of accidents.
- 7. Providing for effective supervision and production control.
- 8. Minimizing work-in-process inventory.
- 9. Providing sufficient and conveniently located service centres.
- 10.Flexibility in design to adapt to the changing future requirements.

Criteria of plant layout for prefabricated plant

Selection of prefabrication plant is mainly based on type of element to be produced, desired output volume, location at which the plant will operate. These are the major factors deciding the type of prefabrication plant.

In the planning stage of prefabrication plant the following points are to be considered,

1. Selection of type of plant:

Permanent field plant or building site plant may be selected.

2. Location of the plant site:

It is based on raw material availability, transport facility, availability of labour, availability of power and water, location of marketing area, availability of suitable land, disposal facilities etc.

3. Type of production process used:

Stationary mould, Movable mould may be used.

4. Finalizing the area required:

Finalizing the area required for storing the raw materials like fine and coarse aggregate, reinforcements, cement, finished elements etc, various sub assemblies to be prepared in plant by using steel bars, rods, and meshes which must be cut, bend, weld, tied before placing inside the mould. Hence sufficient space for auxiliary activities is required.

5. In case of movable mould line, if the mechanical failure happened, one mould in the line can affect the fraction of

the whole line, hence suitable arrangements are planned to overcome such a problem.

- 6. For withdrawing the malfunctioning the mould or repairing the prefabricated element, the provisions are provided to take it away from the line to avoid interruption of flow of work.
- 7. Business plan preparation is must in planning stage, it should contain the capital requirement, list of customers, money required for land, machinery, buildings, and other infrastructure development, expected time to complete the building construction, machinery installation, other infrastructure work, time to make profit, targeted customer list etc.
- 8. Planning of production type gives the solution to the following type of machinery to be installed, plant layout design, preparation of procedure and systems for operation and management, planning of prefabricated plant before doing a very casual factor in deciding the overall profitability of the project.

Factors to be considered for effective plant layout :

The manufacturing cost of a prefabricated element will depend on how well the plant equipment and machinery placed within the site.

For the effective plant layout the following principle factors are to be considered.

1. Manufacturing cost:

By reducing unwanted material and man work it is possible to reduce the manufacturing cost.

2. Process requirements:

The machinery and equipment should be planned to the place the position according to the sequence of operations to be carried out in the prefabricated element.

3. Nature of operation:

Important machinery used for frequent operations should be located very conveniently.





4. Nature of maintenance :

Some machinery or equipment need frequent dismantling and replacing spares for which simple space should be provided in and around the machine.

5. Safety :

Maximum safety to the workers in equipment operation, material handling, rotes of material handling and equipment movement above the workstations should be avoided if it is possible.

6. Future expansion :

Layout design in a prefabrication plant should provide convenient working condition for each process and an efficient flow of labour and equipment between the various working areas for the future expansion.

7. Adequate space between machineries :

Simple space must be provided between the machineries to reduce the congested working atmospheres to the employees and it helps in maintenance, dismantling works of machineries.

8. Adequate space for storage materials.

9. Easy access of labour and equipment to all working areas :

Reduce the unwanted wasting time of man and machines. It helps to improve the utilization of man and machine. By designing good plant layout, it is possible to increase profit, productivity, utilization of man and machine and reduces the accidents, manufacturing cost, hence idle time of man and machinery is possible.

- 10. Nearest location for strong fractional relationship activities.
- 11. Providing shortest and most convenient flow of materials within the plant.
- 12. Providing maximum safety to workers.

- 13. Good visual control of work progress.
- 14. Providing simple space for inspection and maintenance work.
- 15. Flexibility for future expansion.

Characteristics of an efficient layout

The designing of a plant layout should be such that it should maximize the return and minimize the cost of production. The following are the characteristics of a plant layout.

1. Smooth flow of production

Plant layout should be in such a way that there must be a smooth flow of production. Raw materials and workers must have access to each machine without any difficulty and delay.

2. Maximum utilization of available space

An efficient plant layout must be such that may utilize the maximum of the space available.

3. Facilities the movement of men, materials and machines, etc.

There must be sufficient space left in between different machines so that raw materials, workers and machines move very easily from one place to another, without the fear of accident.

4. Involves minimum handling

The various machines in a good layout must be arranged in such a manner that the product of one operation may pass on to the next operation with a minimum of handling. It will reduce wastage of raw materials and labour hours.

5. Provides better working conditions

A good plant layout must have facilities such as water, ventilation, retiring room, etc., in the plant. It should also safeguard the health of the workers.



6. Flexibility

A good layout must be flexible enough so as to incorporate any change in the management policies. It must be capable of incorporating, without major change, new equipment to meet technological progress, or increased production requirement or to eliminate waste.

7. Location of stores

The stores in a plant must be located in such a place from where raw materials, tools, equipment and other materials may be supplied to the departments concerned easily, without any delay.

8. Facilitates supervision and control

The position of workers must be arranged in such a way that it facilitates supervision, coordination and control.

9. Provision of safety

There must be complete safety for workers engaged on a machine. Necessary instructions must be given to them about the risks involved while working in certain type of machines. Provisions of Factories Act must be followed in real spirit.

10. Co-ordination and integration

If the plant layout is efficient enough, it is possible to achieve maximum with coordination and integration among men, machines and materials.

A decision to manufacture some new or modified products may necessitate a reorganization of the existing plant or provision of additional facilities. The reasons for change are due to variation in the level of demand, change in the location of product markets, change in style and obsolescence or failure of existing equipment.

Steps involved in designing a plant layout

Since decisions regarding layout design have considerable impact in the efficiency and profitability of a firm it requires

careful consideration. The following are the steps involved in designing a layout :

1. Collection of required data

Data about the size of the plant, type of products to be produced, method of production to be adopted, extent of space available, extent of mechanization etc are to be collected.

2. Preparation of blueprint for the floor plan

Based on the data gathered, a blue print has to be prepared for the floor plan. Care should be taken to ensure, that the layout provides for unhindered movement of men and materials with minimum possible effort and time.

3. Preparation of process chart and flow diagram

The process chart and flow diagram depicting the various activities to be performed and the linkages between them has to be prepared.

4. Preparation of draft layout

A draft layout needs to be prepared clearly depicting the positioning of men and materials and the process flow. The draft layout should be circulated and discussions held with employees inviting suggestions for improvement. Flaws pointed out need to be corrected and suggestions received incorporated after due discussions.

5. Test run

A test run is important to understand the efficiency of the layout in a real time work environment. Problems not noticed in the earlier stages can occur at this stage. The initial problems noticed need to be modified and test runs should be continued for at-least a few times to ensure that the layout is able to facilitate maximum production at minimum cost.

Features of a good layout

1. Efficient space utilization

Real estate costs are rising by the day. An ideal layout should utilize the available space in an effective way.





Wastage of space should be avoided at all costs. The arrangement of equipment, service points and workers should be done in such a way that space is properly utilized.

2. Flexibility

Manufacturing operations are dynamic in nature. There is continuous innovation in types of products manufactured as well as in equipment, techniques and processes of production. Therefore the layout should be designed in such a way that the layout is flexible enough to adapt to changes.

3. Accessibility

Manufacturing, maintenance and servicing facilities should be easily accessible without any hindrance. To achieve this purpose, there must be sufficient space between equipment so that raw materials, machines and men are able to move freely from one place to another.

4. Economy in handling

The layout should facilitate economies in handling materials, work-in-progress and finished stock. Handling should be reduced by the optimal use of hoists, chutes, trucks lifts, conveyors etc.

5. Minimum movement

The layout should be so designed that there is, minimum movement of men and machines. Movements should be direct as far as possible. Indirect handling of materials would unnecessarily add to the cost without any value addition. Therefore indirect handling should be avoided as far as possible.

6. Ensuring Co-ordination

A good layout would be able to co-ordinate all operations. The layout should be designed taking into account the inter-relationships between various equipment, departments and personnel. It is therefore important that while planning the layout the complete picture of the organization is considered.

7. Visibility

Work should be arranged in such a way that there is no problem in supervision, co-ordination and control. Raw materials, work in progress and finished goods should have specific storage points and must be visible at all times. This would reduce the problem of pilferage, theft etc.

8. Reduced discomfort

The layout should be designed in a way that there is minimum discomfort to the workers. It should provide for proper lighting, ventilation and reduce the impact of heat, noise, vibrations, dust, fumes, odours etc.

9. Adherence to statutory regulations

The layout should adhere to the regulations of the Factories Act with regard to health, safety and welfare of employees. Adherence to the above regulations would minimize accidents, reduce absenteeism due to sickness contributing to improved productivity.

10. Preservation of materials and equipment

The layout should contain safeguards against fire, moisture, theft and general deterioration of equipment and materials. There should be adequate and safe storage locations. There should be provision for storing inflammable materials separately and in a safe manner.

Store Management in a plant

Proper management of store is the vital lifeline for smooth conduct of a plant. Principles and benefits of a Good Store Location and Layout are briefly explained as follows.

1. Economy in cost of transportation

Location of store building or storeroom layout has a wear on the cost of transportation. The store location should be such that unnecessary material handling is avoided. For example, store building should be located within the factory premises or near to the place of work where materials are required.



While selecting a place of store building, the material handling facilities for transporting materials from and to the store should be taken into account. Proper rail sidings and road facilities to the store should be ensured so that materials can be brought directly up to the receipt counters.

2. Approachability by railroad transport

Raw materials like coal, coke, manganese and ores should be stored in open and in such a way that they can be easily removed by trucks, cranes and conveyors. Also the location of the store should be approachable by rail or road transport.

3. Efficient service

Location of the store should result in extending efficient service to the user departments. As a general rule, raw material store, forgings, castings, bar-stock, etc., should be located near to the shops where initial operations are performed. Finished parts store should be located in the proximity of shipping operations. Jigs and fixtures should be stocked near the materials. Tools and supplies required on daily basis should be stored near production shops.

4. Reduced fire risks

Materials should be stored in locations which minimize fire hazards. For example, inflammable materials like petrol should be stored separately. Consumable material such as paints, oil, grease, cotton waste, etc., should be kept away from one another and from general stores. Oxidizing agents should be kept away from combustible materials.

5. Safety and Security

For security reasons, storeroom should be away from the main gate of premises. Storeroom should not be located near the factory wall where they are likely to scaled by outsiders. Main stores should be located in such a way that suppliers' representatives, drivers and others do not have easy access to it.

6. Minimization of risk of spoilage and deterioration

While selecting a suitable site for the store, due consideration should be given to temperature, humidity, and lighting requirements.

7. Flexibility for future expansion

While selecting the store site, future expansion needs must be considered. Sufficient space should be available for future expansion of the store department to prevent crowding/congestion or for avoiding the need for shifting the store to another location at a later stage.

8. Overall integration of factors

Since it is almost impossible to satisfy each and every factor, store location should be such that it results in overall integration of factors.

- **9.** The gangways should be wide enough to ensure smooth movement of stores' trolleys and must facilitate easy withdrawal of parts from bins and racks.
- **10.** Obstructions of all forms such as poles, etc., should be eliminated.
- **11.** The stores racks should not prevent the normal movement of air.
- **12.** In the production area, a leaking roof is immediately noticed whereas it is not so in stores. Hence, we must ensure constantly that the stores are totally water-proof.
- **13.** In the vertical stacking, the load should be distributed evenly and should be broken by intervening shelves.
- **14.** A location system should be so devised that it may indicate precisely the exact position of all items stored inside the store-room.
- **15.** The stores area should be equipped with handling equipment such as cranes, lifts, hoists, etc., and weighing scales.





Storeroom Layout and other factors

Storeroom layout is proper placement of materials and storeroom equipment. It may broadly include departmentalizing the stores, placing the shelves, racks or other equipment appropriately, and proper placement of materials with sufficient space for material handling and labour movement.

Example of a typical stores layout



Objectives of efficient store room layout

An efficient Store-room layout should serve the following objectives :

- 1. Reduced investment in shelves, racks or other equipment,
- 2. Reduced operating expenses by minimizing the movements of materials and thereby reducing the internal transportation cost,

- 3. Increased flexibility,
- 4. Increased safety of workers and materials,
- 5. Easy accessibility and good housekeeping,
- 6. Convenience of traceability,
- 7. Suitability to the nature and volume of materials and
- 8. Maximum utilization of floor space.

Important factors in Good Store-Room Layout

While laying out a storeroom, the following factors should be given due attention :

1. Nature of materials

Heavy and bulky materials demand special attention in movement and handling and may call for their placement near the user department or near the despatch section to minimize movement and may be placed on the ground floor for easy handling.

Small, light items can easily be moved and handled and may be placed away from the despatch section and on the racks. The costly items might require closed shelves which may be locked and should be placed where proper control may be exercised and general entry may be restricted.

The fragile materials should be carefully stored. The materials which are inflammable, such as petrol, kerosene, oil, acid, etc., should be stored separately, away from the general stores.

2. The volume of materials

The space requirements depend upon the quantity and the bulky nature of materials. The storeroom should provide sufficient space on the ground and in the racks and shelves for the materials to be stored at a time. The space requirements should also take into consideration, the handling characteristics and the nature. of material handling equipment.



3. Floor and air space

While planning a layout, available floor space and ceiling space should be utilized to the maximum.

4. Scope for future expansion and flexibility

Since expansion and changes me necessary, the layout of the stores should provide for future expansion and flexibility.

5. Accessibility

The layout of the stores should also take into consideration the convenient accessibility to the stored items for quick retrieval. There should be adequate space for operating trolleys, forklifts, etc.

6. Type of storage equipment

The type of storing equipment such as shape and size of the bins, pallets, racks should also be considered in stores layout.

7. Protection

Since protection of materials is an important objective of stores-keeping, the materials should be placed in a manner that it minimizes the loss of materials against theft, pilferage, etc.

8. Proper illumination and ventilation

The stores should be properly illuminated either by natural or artificial lighting. It should be properly ventilated also.

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The layout should be designed in a manner that the twin objectives of improving efficiency and reduction of costs are achieved. It should minimize movement of man and machine. Smooth operation of the manufacturing process should be facilitated and work in process inventory reduced. A layout with the following characteristics would be able to fulfil the above mentioned requirements :

Supervision is a quasi-managerial function. Supervision involves directing and overseeing the job of subordinates which normally includes, rank and file employees, blue collar technicians and workers carrying out their operations in an organization. Supervisory function is performed with a view to ensure that subordinates work effectively and efficiently so that the organizational goals can be attained.

(Tto be continued to next issue.....)





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SOME EXPERIMENTS IN THE BEAMSHED PROCESSING OF GREEN HIDES*

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Summary

A comparative assessment has been made of side upper leather produced from hides which were processed either (i) from the salt-cured state, (ii) directly from the green state using either a water of a brine soak and (iii) after a shortterm preservation treatment with sodium chlorite. Green hide processing was shown to produce the following improvements in leather quality over cured hide processing : increased tightness of grain break and decreased prominence of both growth marks and veins. There was no marked effect on areal yield or on physical properties of leather as reflected in the Lastometer test. On the other hand, it has been shown that some modification may be necessary in the normal beamshed processing in a particular tannery to avoid production of excessively firm leather from green hides. Under the chosen experimental conditions, there was no advantage in using brine rather than water in the initial soaking of the green sides.

Introduction

This paper reports the results of a series of experiments on the processing of green hides which were carried out jointly by the CSIRO Leather Research Section and the tanning division of Pizzey Ltd. The major aims of the experiments were to investigate a number of alternative methods which might be used for green hide processing and to compare the physical and subjective properties of leather produced from green-processed hides against those of leather produced from salt-cured hides.

The experiments were planned on a matched-side basis and, as individual sides wore to be weighed and examined throughout the trial, the number of hides

- * Vary Bros. Pty. Ltd., 21 Boundary Road, North Melbourne, Victoria, Australia: 3051 (sormerly of Pizzey Ltd., Richmond).
- * The paper is based upon an address presented to the Leather Guild in Melbourne on 22nd June, 1970.



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used had to be manageable and yet sufficient to make up satisfactory loads and to yield valid results (). It was desired to process various treatment packs on the same day and, as only one medium-scale drum was available, it was decided to carry out the experimental beamshed processes in paddles. The paddles used were of 700 gallon capacity which permitted a reasonable liquor-to-pelt ratio for the chosen experimental loads.

Plan of Trial

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Six different comparisons were investigated, as follows :

Experiment A

This was a comparison between sides cured in a normal salt stack (Treatment S) and matching green sides which were washed in water before liming (Treatment G).

Experiment B

This was a comparison between salt-cured sides (Treatment S) and matching green sides which were washed in brine before liming (Treatment GS).

Experiment C

This was a comparison between salt-cured sides (Treatment S) and matching green sides which had been treated with the recently-developed shortterm preservation method (2) using sodium chlorite (Treatment GC).

Experiment D

This was a comparison between green sides which were washed in water before liming (Treatment G) and matching sodium chlorite-treated sides (Treatment GC).

Experiment E

This was a comparison between green sides which were washed in water (Treatment G) and matching green sides which were washed in brine (Treotment GS) before liming.

Experiment F

Since paddles were to be used for the beamshed processing, this experiment was designed to relate the experimental paddles process to the normal drum liming precess used in the tannery. The comparison was therefore between saltcured sides which were soaked and limed in the paddle (Treatment P) and matching salt-cured sides which were soaked and limed as part of a production pack of hides in a drum (Treatment D),



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PROCESSING OF GREEN HIDES

Twelve hides were used for Experiment A and 10 hides for each of Experiments B-F.

Preparation of Hides

For Experiment A, 12 fresh Hereford hides (green weight 63-98 lb., mean weight 78.3 lb.) were cut accurately along the backbone and each side was weighed and numbered. The sides were allocated to Treatments S and G, taking alternate left and right sides for each treatment.

For Experiments B-F, a further 50 fresh hides of mixed breed and weight were sorted into five given weight ranges viz. 50-60lb., 61-70 lb., 71-80 lb., 81-90 lb. and 91 lb. and above. For the five experiments, five packs of 10 hides were then selected, distributing hides from the various weight ranges as evenly as possible over the packs. For each experiment the hides were cut accurately along the backbone, weighed, numbered and then allocated to the two treatments in each experiment, again alternating left and right sides.

Pre-Tanning Processing Methods

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1. Salt curing (Treatment S)

The 52 sides to be salt-cured were covered with a commercial salt containing 1 per cent, naphthalene/1 per cent. boric acid and laid down in a stack by experienced personnel. The sides were placed ridge-to-ridge to reassemble the shape of hides in a single stack and then left in the hide store for 3 weeks. The cured sides were shaken free of loose salt, weighed and processing was then commenced, as follows :

(a) Ten sides from Experiment F were included in a 6,000 lb. pack of hides which were processed (Treatment D) by the normal tannery method. Thus, the hides were soaked (3 hr.) in water (200 per cent. on hide weight) in a drum operating at 2 r.p.m. and then, after draining, were washed in running water (20 min.). They were then drummed (30 min. with sodium sulphide (4 per cent., on hide weight) in water (300 per cent.), lime (2 per cent.) was added and the drum run continuously for 4 hr. and then fer 5 min. every hour overnight. The following day the drum was drained and the hides were washed (30 min.) and fleshed before chrome-tanning.

(b) The remaining 42 cured sides were soaked and limed simultaneously in two identical paddles. They were first paddled (3 hr.) with cold running water and then the water flow was stopped and sufficient sodium sulphide added to



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produce a 1 per cent. solution. After paddling for 1.5 hr., the hair was loosened, and lime was added to give a concentration of 1.5 per cent. The paddle was run for a further 1.5 hr. and then left stationary overnight. The following day, the paddle was run for 1 hr. and the sides were then washed (1 hr.) and fleshed before chrome-tanning.

2. Green processing with water wash (Treatment G)

The 32 sides to be processed green with a water wash were soaked and limed together in one paddle. The fresh sides were paddled with cold running water until clear (1 hr.) and a 1 per cent. solution of sodium sulphide was then prepared in the paddle. Paddling was necessary for 2.5 hr. to loosen the hair and lime was then added to give a concentration of 1.5 per cent. The paddle was run for a further 1.5 hr. and then left stationary overnight. The following day, the paddle was run for 1 hr. and the sides were then washed (1 hr.) and fleshed before chrome-tanning.

3. Green processing with brine wash (Treatment GS)

The 20 sides to be processed green with a brine wash were treated as described in 2 above except that, instead of the initial water wash, they were paddled (3 hr.) in brine (3.5 per cent. solution) and then washed (1 hr.) in cold rubning water before liming.

4. Chlorite preservation (Treatment GC)

The 20 sides to be processed after short-term preservation were soaked (36 hr.) with occasional agitation in a solution (2) containing sodium chlorite (0.375 per cent., on hide weight) and sodium pentachlorophenate (0.05 per cent.) in water (100 per cent.). The drained sides were then stored under polythene sheeting (to prevent excessive drying) for 5 days and finally soaked and limed as described for Treatment G sides in 2 above.

Standard Deliming to Chrome-Tanning Process

After being fleshed, the various groups of sides were weighed and included in packs of sides which were all given the normal chrome-tanning process. Due to necessary delays in the salt-curing and chlorite-preservation treatments, all sides could not be tanned together but formed parts of three separate production loads. The following method was used, all percentages being based on limed, fieahed weight :

The sides were delimed and bated by drumming (50 min.) in water (200 per

PROCESSING OF GREEN HIDES

cent.) at 100°F. containing ammonium chloride (2.0 per cent.). hydrochloric acid (0.25 per cent.), Lissapol N 450 (0.25 per cent.) and commercial bate (0.25 per cent.). The drained sides were washed (20 min.) and then pickled (2 hr.) in water (60 per cent.) containing sodium chloride (4 per cent.) and sulphuric acid (1.6 per cent.).

The pickled sides were tanned by drumming first for 5 hr. with a glucosereduced 33 per cent. basic chrome liquor (14 per cent., containing 13 per cent. Cr_2O_3) and then for a further 2 hr. after addition of sodium bicarbonate (0.75 per cent.). After standing overnight, the drum was run for 1 hr. after addition of further sodium bicarbonate (0.5 per cent.).

The chrome-tanned sides were piled for 24 hours and then sorted according to substance into two groups, viz., pairs of sides which could be split and shaved to 3.5 mm. thickness and those which could only be split and shaved to 2.2 mm. thickness. The number of sides in each thickness group in the various experiments is shown in Table 1.

TABLE 1—Distribution of Sides between the two substance groups in each experiment.

	Number of split sides			
Experiment	3.5 mm.	2.2 mm.		
A	2	22		
в	6	14		
C	10	10		
D	10	10		
Е	14	6		
F	10	10		

The distribution between the two substance groups in Experiment Λ markedly differs from that in the other experiments due to a different source and different weight distribution for the original hides in this experiment.

Standard Retannage to Fat-Liquoring Process

The shaved sides were included in normal production packs for retaining, dyeing and fat-liquoring as follows, all percentages being based on shaved weight :

The sides were washed (10 min.), drained and retanned with a commercial self-basifying chrome-tanning powder (4 per cent.). The drained sides were then neutralised (20 min.) with sodium bicarbonate (1 per cent.) in water (300 per cent.), drained and washed, increasing the temperature to 130°F. After draining, the sides were dyed (30 min. with Airedale Black TX (1 per cent.) and



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Haematine (0.5 per cent.) in water (150 per cent.) at 130°F. and then fat-liquored (30 min.) with a mixture of mayonnaise oil (4 per cent.) and raw neatsfoot oil (1 per cent.). The sides were piled overnight, set out and then paste-dried in the normal way.

Finishing Procedure

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The dried sides were washed, conditioned and first passed through a roller, staking machine; they were then assessed for final staking requirements and accordingly staked on a Slocomb machine. The staked sides were aired off and finished as full-grain leather, as follows : the sides chrome-split to 2.2 mm. were seasoned, glazed, sprayed with pigment, plated and sprayed with lacquer; the sides split to 3.5 mm. were simply plated.

The finished sides were sorted into six Experiment groups and then subdivided into the two substance types within each group. The matched sides were then examined in pairs by experienced tannery personnel who made comparisons of the following properties of the sides without knowledge of their processing treatments :

- (a) Grain "break" and appearance.
- (b) Prominence of growth marks.
- (c) Prominence of veins.
- (d) Firmness ("feel").

The area of the finished sides was also determined using a standard tannery machine. The results are presented below, together with a number of observations which were made on the sides at intermediate stages throughout the processing.

In addition, Lastometer tests were performed on all of the sides in Experiment A. The maximum possible number of test squares (6 in. x 6 in.) were cut out from over the entire area of each side and Lastometer tests were carried out on each square using the official method (3); the total number of tests per side varied from 72-82. The results obtained for matching samples from the two treatments (S and G) were compared by analysis of variance in the OBC 3600 computer.

Results

1. Assessment of sides during processing

The following general observations on the sides were made at various stages throughout the processing by experienced production personnel in the tannery :



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(a) After liming: The salt-cured sides were normal. The most important observation was that the green-processed sides (Treatments G and GS) showed improvement in that the grain appearance was particularly good and the growth marks were not nearly as prominent as in the corresponding cured sides.

(b) After chrome-tanning: The salt-cured sides were normal. The greenprocessed sides (Treatments G and GS) showed marked improvement in that the gain was smoother and considerably tighter and the growth marks were far less prominent; interestingly, the green sides oppeared less firm than the cured sides at this stage. The chlorite-treated sides (Treatment GC) also showed a tighter grain less marked "grawth" than the cured sides.

(c) After paste-drying: The salt-cured sides were normal. The greenprocessed sides (Treatments G and GS) still showed a tighter break and less pronounced growth marks but were now considerably firmer than the corresponding cured sides. The chlorite-treated sides (Treatment GC) were generally similar to the green sides. It was decided that considerably less staking was necessary for the cured sides than for the other groups of sides.

(d) After staking: The salt-cured sides were normal. Although relatively heavy staking was used for the green-processed (Treatments G and GS) and chlorite-treated (Treatment GC) sides, they still showed an overall improvement in grain appearance, break and prominence of growth marks.

2. Assessment of finished leather

in the

A number of general trends were noted from an examination of the finished leather in the various experiments. The main conclusions can be summarised as follows :

(a) Grain break—As indicated throughout the processing, the finished sides processed without salt-curing were in general tighter than the corresponding cured sides, irrespective of whether the leather was chrome-split to 2.2 or 3.5 mm. Thus, there was a marked improvement in grain break in (i) the green watersoaked sides compared with salt-cured sides (Experiment A), (ii) the green brinesoaked sides compared with salt-cured sides (Experiment B) and (iii) the chlorite-treated sides compared with salt-cured sides (Experiment C). The tightness of the break decreased in the following order for the various treatments : GS (apprx. equals) G (greater than) GC (greater than) S

It was also found (Experiment F) that the experimental paddle liming process generally produced a tighter grain break than the normal drum liming.



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A further advantage obtained from green-processing was shown to be the production of a smoother grain surface which would be particularly relevant in full-grain leather manufacture.

(b) Growth marks — The decreased prominence of growth marks observed during processing in the sides which had not been salt-cured again persisted through to the finished leather. Thus, there was a marked improvement in "growth" in (i) the green water-soaked sides compared with salt-cured sides, (ii) the green brine-soaked sides compared with salt-cured sides (especially for the 2.2 mm. leather) and (iii) the chlorite-treated sides compared with salt-cured sides. The quality decreased in the following order for the various treatments : G (approx. equals) GS (approx. equals) GC (greater than) S.

In contrast to the grain break results, it was shown that the paddle liming generally produced leather with a slightly more marked accentuation of growth marks than drum-liming.

(c) Veins—In Experiment A. an assessment of the degree of veininess was also made. This provided the most consistent result in the subjective evaluation of the various experimental groups of leather in that, without exception, the green-processed sides showed a marked decreased incidence of veininess compared with the corresponding cured sides. This effect was also confirmed in a subsequent green-processing trial in the tannery.

(d) Firmness—The finished leather from the uncured sides was consistently rated as firmer than that from the corresponding cured sides, despite the relatively heavy staking used for the former in an attempt to produce a comparable mellowness; this applied to both 2.5 and 3.5 mm. chrome-splits. Thus, there was increased firmness in (i) the green water-soaked sides compared with salt-cured sides, (ii) the green brine-soaked sides compared with salt-cured sides and (iii) the chlorite treated sides compared with salt-cured sides. The degree of firmness decreased in the following order for the various treatments : GS (greater than) G (greater than) GC (greater than) S. It is interesting that this increased firmness did not show up in the processing until after the sides were dried. The paddle liming process also produced a slightly firmer leather than drum-liming.

Despite this apparent disadvantage, it has been shown in subsequent trials that the loss of mellowness observed here in the processing of uncured sides can be largely overcome by modification of the wet-processing, if necessaay. In these trials, variation in the liming procedure only was investigated but it was shown that appropriate modification of this process could produce leather of acceptable mellowness from green-processed hides.



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(e) Areal yield - The mean areal yield of finished leather for each treatment in the six experiments is shown in Table 2 and is expressed in terms of the percentage area of the finished side (sq. ft.) per lb. green weight of the side. It must be remembered that trimming, although restricted to the minimum necessary for handling of the sides throughout the processing, limits the accuracy of comparisons of areal yield in a trial of this type and small differences are therefore not necessarily significant.

TABLE 2 - Mean areal yield of finished leather in each treatment (Experiments A-F).

ni (2 bra D strand s)	T) Marin duon	Percentag	e yield
Experiment	Treatment	3.5 mm, split	2,2 mm, split
A	G	59.6	61.8
finished leather lo	ita erado Bor	Lastometer 2,85115	62,6
B	GS	51.4 inemiregx3	64.1
Distantion	8	53.3	67.0
C	GC	• 55.7	67.7
	S	55.4	65.7
D 225 -	'ee	55.2	64.6
P	G	53.1	65.0
D	05	man In4.50 month in 1	nortanio 64.5
Tor Billion and Design	G	A Composite that wonth	andie 65.4 with
TO SPORTAGE OF PROPERTY	B	ind 550 metal ci	vitestro884 and
nos Brook abarta dista	P	is from BE to contract to	100 100 100 100
or and the second second	D	off in main of original	aton vindenility

It can be seen that, in most cases, there was little effect on yield produced by the different treatments in each experiment. The only effect which may be significant (although further investigation is required) is the decreased yield obtained from green sides processed with a brine wash (Treatment GS, Experiments B and E); the agreement between other treatments in each experiment are all acceptable within expected limits.

One feature worth noting is that there was a considerable range of variation in yield for the individual sides within any one treatment group This was shown to be due largly to variation in the original weight of the hides in each group. It was shown, in fact, that for each type of leather (2.2 or 3.5 mm. chrome-splits) there was an approximately linear relationship between weight and percentage yield such that the higher the original weight of the hide, the lower was the percentage yield of leather obtained and vice versa. This can be expressed mathetmatically as follows :

Y=a-b.W

where Y (sq. ft. per lb.) and W (lb.) are the percentage areal yield of the final



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leather and the original weight of the hide respectively, and a and b are constants whose value will vary according to the nature of a particular tannery process, the type of hide, the thickness of the split and so on. This is a factor which should be considered not only in routine tannery processing but also when it is desired to compare the yields resulting from variations in the tannery processing method; in the latter case, it is obviously desirable to carry out such comparisons on a matched-side basis,

(f) Lastometer test-Table 3 shows the mean values obtained for thickness, Lastometer load and Lastometer distension at grain crack for the 11 finished sides in each of the two treatment groups (Treatments G and S) in Experiment A which were chrome-split to 2.2 mim.

TABLE :	B-Lastometer results Experiment A.	(grain crack) for	finished leather in
Treatment	Thickness	Load	Distension
7.71	(mm,)	(kg.)	(mm.)
8 7.0	1.68	43.0	7.33
GALA	1.69	43.3	7.33

Examination of these overall mean values and analysis of the values for individual sides show that there was no significant difference in thickness or, more importantly, in Lastometer load or distension at grain crack between sides which were green-processed and those which were salt-cured; this is particularly note-worthy in view of the relatively heavy staking applied to the uncured sides. Furthermore, it was also shown, by calculation of the coefficients of variation for the individual sides, that there was again no difference between the two treatments in the range of variability observed in each of these parameters over the whole of each side; this is of interest as one of the aims of the trial was to determine whether green-processing might produce leather with more uniform properties over the area of the hide.

Table 4 shows the corresponding mean values for Lastometer load and distension when the leather was tested to "burst."

LADLE 4-Lastometer Re	esults (burst) for finished leather
Experiment A.	there takes materill givian norgan na take an
of the later the loads which the	Configurer Totalarto and unifield with a stat dours D
Treatment	Load
(mm).	(kg.) (mm.)
8	74.6 10.01
G	68.4 9.56



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Clearly, there was a decrease in both the bursting load and distension in the green-processed sides and the statistical analysis showed that, in each case, this was significant at the 0. 1 per cent. level. However, this does not constitute a serious objection to the processing of green hides. It is considered that the most likely explanation for this effect is the heavy staking used for the green sides in the present experiment: although not affecting the grain strength of the leather (Table 3), this has apparently caused some weakening of the whole structure which was revealed only when the leather was tested to "burst".

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Economic Corner_____

GST DEFICIT: STATES SHOULD NOT BE ASKED TO BORROW, SAYS MITRA



"It appears that our worst fears have come true," West Bengal finance minister Amit Mitra wrote to union finance minister Nirmala Sitharaman on the central government's stance that it was not in a position to pay GST compensation to states due to dip in collections.

He proposed that the centre must pay compensation from different cesses that it collects, as it is not getting devolved to the states.

"In case of the shortfall, it is the responsibility of the center to garner resources for fully compensating states, as per the formula agreed upon with the states," he added.

The letter comes a day ahead of the crucial GST Council meeting to hammer out a solution for protecting states' revenue when the designated fund for the purpose is all set to prove completely inadequate in the current fiscal.

In his letter, the state finance minister said that under no circumstances, the states should not be asked to borrow from the market as it would increase their debt service liability and may end up squeezing the expenditure capacity of states.

He proposed that the centre must pay compensation from different cesses that it collects, as it is not getting devolved to the states.

"In case of the shortfall, it is the responsibility of the centre to garner resources for fully compensating states, as per the formula agreed upon with the states," he added.

Mitra said that the constitutional amendment to guarantee a 14% y-o-y revenue growth for states was brought about with full support and agreement of the centre. "It not only cast upon

the centre a constitutional obligation but also a moral one as well, to safeguard the sensitive fiscal relationship that exists between the centre and the states and which is highly skewed in favour of the centre," he said.

He further said that those who are taking a strident position are either not aware of the spirit and intent of the constitutional amendment or are consciously turning a blind eye to renege the sovereign promise to the states.

"The introduction of GST in a trudy federal country like ours has been rightly hailed world over as the most innovative example of cooperative federalism, based on mutual trust. Some dent in the trust has already been made due to delayed payment of GST compensation. Let us not do anything that will give a death blow to this unique collective effort," Mitra said.

(Source : Financial Express – 27/08/20)

MODI GOVT'S TAX CHARTER READS LIKE A CRUEL JOKE



'Under this government, tax laws have become more draconian, and the government itself is setting stiff, unrealistic targets for tax officials, who have got more powers to harass us,' points out Debashis Basu, **editor of** *www.moneylife.in*.

Recently, the government announced a taxpayers' charter, which lists the rights of assessees under the Income Tax (IT) Act.

The charter is a bunch of promises, full of homily-like vision statements such as: Provide prompt, courteous, and professional assistance; treat taxpayers as honest; provide a mechanism for appeal; provide complete and accurate information; provide timely decisions; collect the correct amount

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of tax; respect the privacy of the taxpayer; follow due the process of law and be no more intrusive than necessary; hold various authorities accountable; provide a complaint system, etc.

How does all this square with the reality on the ground ?

Who believes this? 'The tax terrorism prevailing in the country is dangerous. One can't run the government by thinking that everyone is a thief.' That is Narendra Modi to businessmen, in January 2014, when he was not yet prime minister.

The moment he came to power, the government started issuing strange demand notices and changing tax laws to make them more draconian and — more alarmingly — with retrospective effect.

When people started complaining about tax terrorism, then finance minister Arun Jaitley resorted to misdirection: 'The opposite of tax terror cannot be a tax haven.'

Sounding exactly like earlier finance ministers Pranab Mukherjee and P Chidambaram, he asserted the government would not let go of what it saw as 'legitimate tax demands'.

India slapped tax notices on foreign institutional investors to extract Rs 40,000 crore from them under the tortuous minimum alternate tax (MAT) when that action perversely over-rode the benefits given to foreign entities under the country's bilateral tax treaties.

India became a laughing stock of the world's business and financial community.

The pre-election promise to end tax terrorism sounded like a cruel joke. It has got worse every year.

Draconian laws: Under Sections 132 and 132A of the I-T Act, the department can conduct a search and seizure (popularly called raid).

In 2017, these sections were amended. Now the department can raid you if it has 'reason to believe' or 'reason to suspect'. But it does not have to disclose the reason to any authority or even the appellate tribunal.

For this, Section 132(1) was amended retrospectively from April 1, 1962, and Section 132 (1A) from October 1, 1975!

Is this a just, fair, accountable system that the charter is talking about ?

Under Section 276CC, failing to file tax returns in time attracts rigorous imprisonment for six months to seven years, plus a fine if the tax amount is more than Rs 1 lakh — even if the taxpayer pays up the tax amount due on his own, along with the penalty.

Is it a just and fair system that the charter promises to jail a late filer, who is clearly not a tax evader ?

The Goods and Services Tax (GST) imposes criminal penalties for simple mistakes to frauds. GST commissioners can arrest people without registering an FIR and businessmen do not have the option of anticipatory bail.

These and many other punitive sections were introduced by the Modi government to create an 'anti-corruption' image.

Ignoring cries of tax terrorism" As tax terrorism increased sharply, more and more people started complaining.

T Mohandas Pai, former chief financial officer of Infosys and a die-hard fan of the regime, was driven to state bitterly: 'The government has failed to protect citizens and business from a tax system that has run amok with a broken assessment system and a broken appeal system! No major country has both broken.'

'Tax officials seem to think of everybody as evaders and themselves as vigilantes! We have filed returns in over 30 countries, but no country treats taxpayers as badly as India does.'

M R Venkatesh, a practising chartered accountant, said it was not tax terrorism but tax jihadism.

'Those of us who handle the income-tax department or GST or Customs or the excise department on a daily basis can see that the kind of powers given to the officers today... but with no accountability. And they have gone berserk.'

What was the government's response? Mr Modi told a business paper: 'It is a fact that some black sheep in the tax administration may have misused their powers and harassed taxpayers, either by targeting honest assessees or by taking excessive action for minor or procedural violations...I have also instructed...to ensure





that honest taxpayers are not harassed and those who commit minor or procedural violations are not subjected to disproportionate or excessive action.'

Strange advice. We will have draconian rules, but officials are supposed to use discretion in applying them!

In fact, they are not supposed to use discretion and they don't.

Stiff targets: Tax harassment cannot ever reduce because the department has been given stiff revenue targets year after year to feed the monster of big government.

Former finance minister P Chidambaram was notorious for setting difficult targets and thereby unleashing tax terrorism. This government is even more focused and determined. I am told there are even targets for issuing prosecution notices and other penal provisions, which are monitored weekly by New Delhi.

To sum up, under this government, tax laws have become more draconian, and the government itself is setting stiff, unrealistic targets for tax officials, who have got more powers to harass us.

And so, the department's attitude, as a whole, is more and more punitive and tax terrorism has increased.

The charter is the latest addition to the long list of deceitful slogans, coinages, memes, false promises, and insincere announcements that governments excel in.

(Source: www.rediffmail.com)

6 IMPORTANT ECONOMIC LESSONS OF CORONAVIRUS



'The coronavirus epidemic highlights the need to start thinking more actively about multilateral coordination,

including, but not confined to, health emergencies and climate uncertainties,' says Rathin Roy.

The outbreak of the coronavirus epidemic is neither unprecedented nor intractable.

However, its genesis in China, and its transitive impact on global economic activity, portends important lessons for economists.

Globalization brings structural risks that have to be analytically recognized and addressed

Globalization represented the triumph of the theory of comparative advantage as technology and innovation lowered the barriers to locating production in the most globally competitive locations. Production costs fell, and global aggregate demand increased, just as predicted by that theory. China was the biggest driver of this structural change due to its sheer size and scale. The outbreak of coronavirus in China has effectively shown that there are serious structural risks that can disrupt the working of the principle of comparative advantage.

Macroeconomic interventions will not counter these risks

The Federal Reserve acted swiftly to cut interest rates by 50 basis points.

But this only assuaged the US stock markets for 15 minutes as they recognized that such cuts, which essentially cheapen the price of capital and indicate a higher tolerance for inflation, would not address the structural problem of a breakdown in global supply chains.

This breakdown could mean, simply, that increased consumer spending would not be matched with a supply response, resulting in inflation without a corresponding counterrecessionary benefit.

Domestic investment to create alternative supply chains would take time, and would only respond to cheaper capital costs if businesses perceive the rate cut to be permanent and importantly — if aggregate demand would not dampen, given that alternative supply chains would be more expensive than the China driven one.

A conversation with an Indian manufacturer of transformers confirmed this. His profitable company would not relocate production of intermediates currently imported from China. Such relocation, even if financed by cheap capital, would require the



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company to sell its product at significantly higher prices, which would not support current demand levels.

It would make better business sense to wait and shrink production in the interim.

Decentralized supply chains:

Economic activity traditionally involved integrated production clusters because of the high cost of logistics. Competition served to provide alternative suppliers for intermediate goods. Supply chains tended, therefore, to be decentralized and to operate with multiple competing suppliers.

Globalization and supply chain integration meant that only the most efficient location survived: Within that location there is competition, but the location itself becomes an effective monopoly. Decentralized supply chains will become competitive if the risks to such locational monopolies, made apparent by the coronavirus epidemic, are incorporated into investment decisions.

Precautionary inventory management

Before the era of cheap logistics, inventory management was focused on ensuring that firms did not suffer market share losses due to supply chain disruptions. But the logistics innovation and information technology revolutions have made it attractive to minimize inventory holding. This is likely to reverse as companies learn that risks posed by global supply chain disruptions can increase fragility. When Jaguar Land Rover has to ship car parts in suitcases so as to counter supply chain disruptions, then a rethink on optimal inventories is inevitable.

The demise of multilateralism will need to be reversed

It is a paradox that globalization was accompanied by the collapse of its potentially biggest safety net — multilateral coordinated action. Notwithstanding the great success of multilateral coordination in abatement of the HIV AIDS crisis, and the demonstrated success in dealing with potential disruptive threats like cartelized oil prices and the ozone hole

challenge, multilateral coordination to alleviate real sector global threats declined precipitously over the past 30 years.

Multilateral coordination became focused on trade and financial regulation. The coronavirus epidemic highlights the need to start thinking more actively about multilateral coordination, especially when it comes to supply chain management and global human shocks, including, but not confined to, health emergencies and climate uncertainties.

Importance of domestic demand and frugal logistics

This is perhaps the most important lesson for both developed and developing countries. The pharmaceutical supply chain has involved India producing generics and exporting these to Europe while importing intermediates from China. India supplies 26 per cent of Europe's generics and 24 per cent of US generics.

But the coronavirus crisis has meant that India's ability to produce these generics has been constrained by a bottleneck on intermediate imports on China. This has led to export restrictions on generics, which has caused a supply crisis in the developed world. We thus need to rethink the role of logistics in maximizing growth, and the costs and benefits of being part of global supply chains.

This does not mean we turn inward but rather that we recognize the importance of being frugal with logistics. A frugal logistics chain promotes both decentralized supply and lower risk of disruption. Going forward, there are two important things that large emerging economies like India need to consider.

First, a growth strategy that is based on meeting a broad-based composition of demand is a more resilient strategy than logistics-intensive export-led growth. Second, attention should focus on how to deliver output with less, as opposed to cheaper, or more plentiful, logistics in a quest to better fit in with global supply chains that we now see pose significant risks to economic activity when there are disruptions.

Making local with less movement of goods, inputs, and people offers a more resilient growth path.

-: <u>JILTA</u>: -

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History and Activities of Indian Leather Technologists' Association

The Indian Leather Technologists' Association (ILTA) was founded by Late Prof. B. M. Das, the originator of Dasnay theory and father of Indian Leather Science on 14" August 1950

The primary objectives of the oldest Leather Technologists' Association which celebrated its Diamond Jubilee year in the 2010.

- To bring all concerned with the broad spectrum of the leather industry under one umbrella ٠
- To organize seminar, symposium, workshop in order to create information, knowledge and latest development for the benet of all concerned. To oer a common platform for all to interact with each other in order to understand each other's problems and prospects. 4
- To publish monthly journal as a supplement to those above objectives. The monthly journal of ILTA is known as journal of Indian Leather Technologists' Association and is the most widely circulated technical journal concerning leather technology.
- To publish text books for the benet of students at various levels of study, for the researchers and industry
- To have interface between urban and rural sector. To assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies acceptable and adoptable to the industry. To organize practical training and to provide skilled manpower and to motivate good students for study. To conduct activities related to the growth of the export of leather and leather goods from India.
- As the part of many social activities ILTA has donated Rs. 1 lac to Consul General of Nepal towards relief of ake eected of Nepal on 15" Sept, 2015.

INTERNATIONAL & NATIONAL SEMINAR

- ILTA is the Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS), a 115 years old organization and for the rst time the IULTCS Congress was organized in January 1999 outside the developed countries in India jointlyby ILTA and CLPI. 2017 IULTCS Congress is scheduled to be held in India again. 8° Asian International Conference on Leather Science & Technology (AICLST) was organized by ILTA in 2010
- during its' Diamond Jubilee Celebration year.

SEMINAR & SYMPOSIUM

ILTA organizes Seminar & Symposiums on regular basis to share information, knowledge & latest development and intera for the benet of all concerned. Few are as under

- Prof. B. M. Das Memorial Lecture every year during the Foundation Day Celebrations on 14[®] August every year. Sanjoy Sen Memorial Lecture on 14[®] January every year, the birthday of our late President for several decades. Prof. Moni Banerjee Memorial Lecture on 15[®] March every year, the birthday of this isonic personality. Seminar on the occasion of India International Leather Fair (ILF) at Chenna in February every year.

It has also organized

- Prof. Y. Nayudumma Memorial Lecture.
- Series of Lectures during "Programme on implementing Emerging & Sustainable Technologies (PrIEST)". Seminars in occasion of India International Leather Fair, 2014 and 2015 at Chennai etc. Many reputed scientists, industrialists and educationists have delivered these prestigious lectures. Foreign dignitaries during their visits to India have addressed the members of ILTA at various times.

PUBLICATION

ILTA have published the following books :

- An Introduction to the Principles of Physical Testing of Leather by Prof. S. S. Dutta
- Practical Aspects of Manufacture of Upper Leather by J. M. Dey An Introduction to the Principles of Leather Manufacture by Prof. S. S. dutta
- Analytical Chemistry of Leather Manufacture by P. K. Sarkar
- Comprehensive Footwear Technology by Mr. Somnath Ganguly Treatise on Fatliquors and Fatliquoring of Leather by Dr. Samir Dasgupta
- Synthetic Tanning Agents by Dr. Samir Dasgupta
- Hand Book of Tanning by Prof. B. M. Das
 ILTA has a good Library & Archive enriched with a few important Books, Periodicals, Journals etc.

AWARDS OF EXCELLENCE

ILTA awards Prof. B. M. Das Memorial, Sanjoy Sen Memorial, J. M. Dey Memorial and Moni Banerjee Memorial Medals to the top rankers at the University / Technical Institute graduate and post graduate levels to encourage the brilliants to evolve with the

J. Sinha Roy Memorial Award for the author of the best contribution for the entire year published in the monthly journal of the Indian Leather Technologists' Association (JILTA)

LEXPOs

To promote and provide marketing facilities, to keep pace with the latest design and technology, to have better interaction with the domestic buyers, ILTA has been organizing LEXPO fairs at Kolkata from 1977, Sliguri from 1992 and Durgapur from 2010. To help the tiny, cottage and small-scale sectors industries in marketing, LEXPO fairs give the exposure for their products, Apart from Kolkata, Siliguri & Durgapur, ILTA has organized LEXPO at Bhubaneswar, Gangtok, Guwahati, Jamshedpur and Ranchi

MEMBERS

The Association's present (as on 31.03.2018) strength of members is more than 600 from all over India and abroad. Primarily the members are leather technologists passed out from Govt. College of Engineering & Leather Technology, Anna University, Chennai, rcourt Butler Technological Institute, Kanpur, B. A. Ambedkar National Institute of Technology, Jalandhar and Scientists from Central Leather Re ch Institute

ESTABLISHMENTS

In order to strengthen its activities, ILTA have constructed its own six storied building at 44, Shanti Pally, Kasba, Kolkata - 700 107 and have named it "Sanjoy Bhavan".

This Association is managed by an Executive Committee duly elected by the memb ers of the Association. It is absolutely a voluntary organization working for the betterment of the Leather Industry. None of the Executive Committee members gets any remuneration for the services rendered but they get the satisfaction of being a part of this esteemed organization.



Indian Leather Technologists' Association

[A Member Society of International Union of Leather Technologists' and Chemists Societies]

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