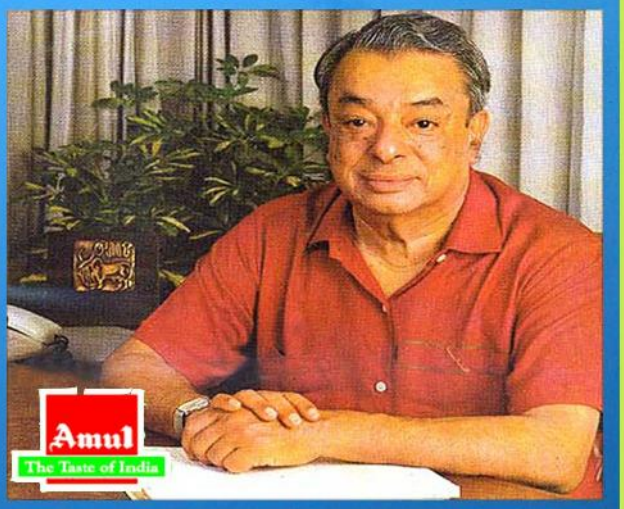
Issue XIII

La Ola

The student's E-Newsletter Of
Indian Maritime University - Visakhapatnam Campus

COVERSTORY

-Magneto Hydrodynamic Propulsion
-Make your own MHD Boat



Our Tribute to the Milkman Dr. Kurien

Featuring this issue:

-Submarine Design - Part II
-Carbon Effects on Ocean Acoustics
-Prepare for an interview

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Issue 13

La Ola

From the Chief - Editor's Desk

La Ola presents its thirteenth edition. The wave is back to engulf all of you into it.

The month of September has been a very busy one. Teacher's Day was celebrated in the campus. Followed by this was the Introductory Gathering for the first years, which was very enjoyable. Cultural events such as painting, sketching & Rangoli was held over the last month. So was the case with Sports, Carrom Championship is over while Chess Championship is underway. Apart from the regular sports calendar, the Campus Leagues of Football, Cricket & Basketball are also going on. All this was topped with the dampness of the non stop rains.

Let me also welcome three new members to our 'Team La Ola' - Tarun Tripathi, Kamal Palariya & Vishal Chowdary of B. Tech Ist Year (NAOE).

This issue of La Ola brings to you some really interesting stuff. The Cover-story on Magneto Hydrodynamic Propulsion & making a simple boat using this concept is really captivating. A continuation of the series on Submarine Design is also included under Submarine Design Part II. Keeping in mind the upcoming Campus Selection Drive, a article on how to make a classy impression during an interview is also covered. La Ola also pays tribute to the Milkman of India—Dr. Verghese Kurien. We have also put in a collection of photographs in the form of a collage.

La Ola being a campus magazine you have an opportunity to put forth your wonderful ideas and develop the creativity of writing too. Hence use the space of La Ola to exhibit your valuable thought provoking talents.

Team La Ola is committed to give its readers the best of the available talents of this campus.

We thank our beloved Director, Prof. S C Misra & La Ola Advisor Mrs. Padmashree.

Happy Reading!!

- Anish Chacko
Chief Editor – La Ola

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MAGNETO HYDRODYNAMIC PROPULSION

A magneto hydrodynamic drive or MHD propulsor is a method for propelling sea-going vessels using only electric and magnetic fields with no moving parts, using magneto hydrodynamics. The working principle involves electrification of the propellant which can then be directed by a magnetic field, pushing the vehicle in the opposite direction.

An electric current is passed through seawater in the presence of an intense magnetic field, which interacts with the magnetic field of the current through the water. Functionally, the seawater is then the moving, conductive part of an electric motor. Pushing the water out the back accelerates the vehicle in the forward direction.

The physics equation describing this propelling force is $F_{mag} = I (L \times B)$ where L is the vector in the direction of the current 'I' and its length is the distance the current travels, B is the magnetic field, and × denotes the cross product.
MHD is attractive because it has no moving parts, which means that a good design might be silent, reliable, and efficient.

Understand Magneto Hydrodynamic Propulsion, by making your own MHD boat:
Here's how to build a simple boat that moves through salt water using MHD propulsion. The craft is not designed for performance; it's designed to demonstrate a functional MHD craft made with inexpensive, easily available materials.

Materials Required:

- 9V batteries (Re-chargeable).
- Two Iron Coins.
- Two short cables with alligator clips on the ends.
- A sturdy foam tray, like the kind used in packing.
- Regular transparent tape.
- Salt - Water.
- Non - Magnetic basin.
- small knife & double sided tape.

Step 1: Wrap the outside of your magnet with a single layer of tape to electrically insulate it.

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Step 2: Using more tape, attach the magnet to the tray. If you have double-sided tape, use a piece below the magnet to help hold it in place.

Step 3: Make the incisions. Use a knife to score a short, narrow slit along two sides of the magnet as shown. The slits should be allowing you to push the two iron coins into the foam tray where they are held in place by friction. The coins should be parallel, centered and as close to the magnet as possible.

Step 4: Carefully attach the 9V battery to the craft; it should stick to the magnet.

Step 5: Begin wiring up the craft:

- Hook one end of each of the two alligator cables to the battery terminals. (Don't hook the terminals to each other.)
- To complete your MHD boat, clip the other ends of the two alligator cables to the two coins. When you float the craft in salt water, the water completes the electric circuit, allowing electricity to flow between the two exposed half-coins on the bottom side of the tray. The electric current flows perpendicularly to the magnetic field, so a force is produced, which will push the craft along.
- Avoid getting salt water in the top of the tray; it will short out the circuit and drain your battery without giving you any propulsion.

Step 6: Get your basin ready and salt the water. The water should be a couple of inches deep, so that the coins won't touch bottom.

Since a small battery is used, the total thrust may not be very high. Most importantly, avoid water currents, wind currents, and nearby magnets or ferromagnetic items. To test your MHD craft, place it in the centre of your salt water basin. The craft will begin to move forward.
To manouvre your boat, add a Air Thruster & an Simple RC Circuit.
It's a vey easy model to make, try your hand at it!! :)

For further interesting stuff on MHD Boats, refer to our site: www.imuvizag.wix.com/laola

References: 1) Magneto-hydrodynamics: Historical Evolution and Trends by Sergei S. Molokov, R. Moreau and H. Keith Moffatt 2) Articles on Magneto Hydrodynamic Propulsion.

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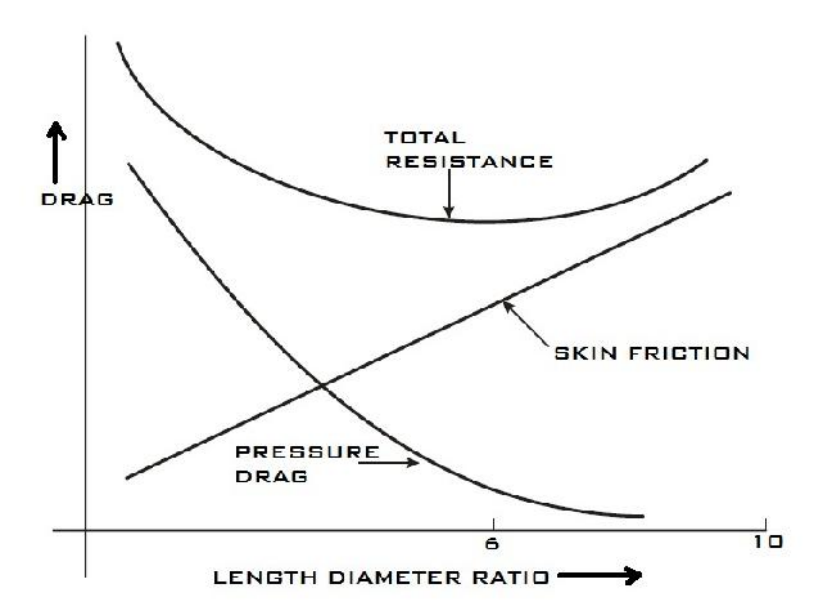
SUBMARINE DESIGN - PART II

Part II of our series on Submarine Design; Concentrating on Hydrodynamic Design Aspects.

Hydrodynamic Design



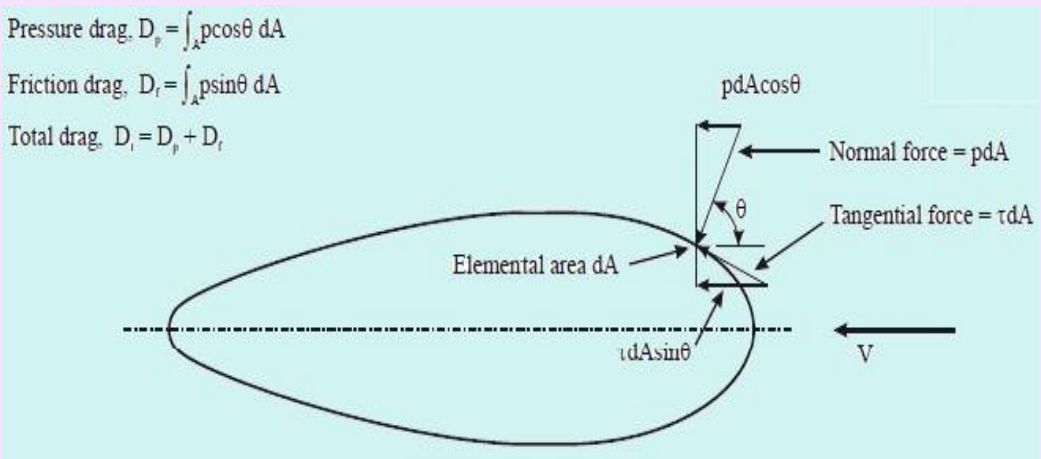
Shape

The shape of the submarine is an important aspect for determining the hydrodynamic design of the submarine, thus the length (L) to beam ratio (B) also becomes an important variable. This is because of variations in two different kinds of resistance, which together make the total resistance of the body of a fully submerged submarine.

They are: a) Form/Pressure Drag and b) Skin Friction.

Pressure Drag

The pressure acts normally on the surface of the submarine and varies along the surface. The pressure is the greatest at the nose, the stagnation point, about which the streamlines divide and it is the least where the streamlines are the closest together and rises where the streamlines diverge. In case of a non viscous fluid, the pressure at the tail and the stagnation point on the nose will have the same value.



However the fluid does have viscosity and this property gives rise to the tangential forces or skin friction. The boundary layer, while initially quite thin, thickens towards the

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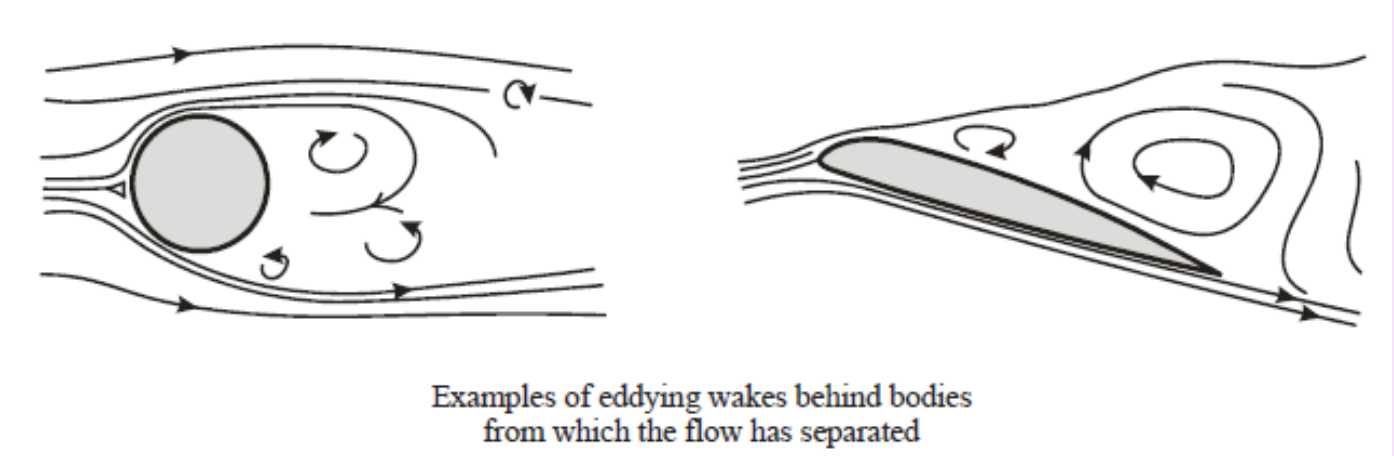
Skin Friction

The second kind of drag, the skin friction drag is proportional to the wetted surface area. This means that a long skinny submarine would have a more wetted surface than a short fat one of the same displacement. There is one more parameter influencing the resistance of a streamlined body i.e. the prismatic coefficient Cp. It describes the amount of volume in the ends of the hull.

The skin friction drag on a flat plate parallel to the undisturbed flow may be laminar or turbulent or a mixture of both. The laminar boundary layer has a low friction, very low noise, occurs at low free stream velocities and is rarely found at higher velocities in a given fluid. The Reynolds number is used as a relation for similarity between model and full scale when two different forces determine the flow pattern, namely inertial force and



Examples of eddying wakes behind bodies
from which the flow has separated

viscous force. So at a given velocity what might give laminar flow near the beginning, becomes turbulent the further one goes along the plate, i.e. as the length increases.

A model can be tested in a wind tunnel so as to know about the flow on a real submarine in sea water. If the Reynolds numbers are the same in each situation then we have a similarity in the results.

At higher Reynolds numbers, the sliding layers of fluid in the laminar boundary layer overturn and rotation occurs in lumps of fluid. This is very noisy and the skin friction is much greater due to energy consumed in the turbulence. That is a case of turbulent boundary layer. The change from laminar to turbulent flow is called a transition.

On a body where the pressure varies according to the shape, a region of falling pressure in the direction of flow encourages longer laminar flow in the boundary layer. Conversely a region of rising pressure in the direction of flow makes it difficult for laminar flow to be maintained.

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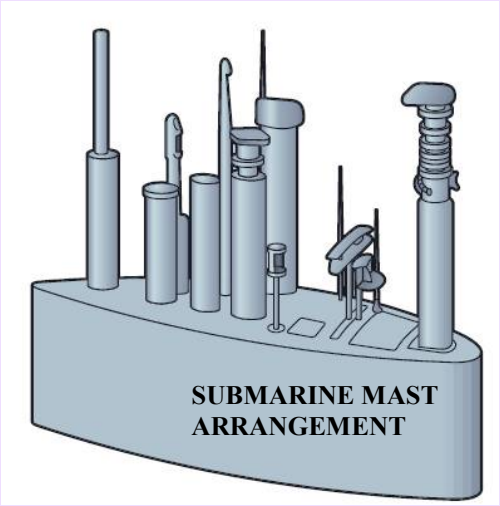
To maintain laminar flow on large objects moving through fluids, like airships, ships and submarines is a very difficult task. If laminar flow could be maintained over a significant portion of the surface of a submarine then the benefits would be significant not only to speed, range and fuel economy but also to noise reduction.

If the region of rising pressure in the direction of flow becomes too severe then this slows the fluid in the boundary layer; it may even bring it to rest and reverse the flow. Then the fluid is no longer attached to the surface and is separated from it. This is called separation. This separation occurs more readily with a laminar boundary layer whereas for a turbulent boundary layer, the greater energy in the layers close to the surface allow them to penetrate much further into the region of rising pressure before they are brought to rest and the flow separates from the surface.

There is a chance of laminar flow being created on the nose portion but it will become turbulent thereafter. If the laminar boundary layer is formed on a blunt nosed submarine shape then a separation bubble may exist. Transition over a bubble can be followed by turbulent reattachment, which is rather noisy and should be avoided.

While considering skin friction, roughness also has to be taken into account. Different degrees of roughness raise the skin friction above that of a turbulent boundary layer on a smooth surface. Roughness occurs due to local damage, structural roughness, welds, change of section, Corrosion (Pitting), paint failures & fouling.

Bluff Body - Masts & Snorkels


SUBMARINE MAST ARRANGEMENT

On a bluff body, the boundary layer may exist on the fore part and the flow may separate thereafter. Hence the drag on the body is almost entirely pressure drag, high pressure in front and low pressure in the rear.

The whole arrangement of masts and scopes should be properly studied and if possible streamlined so the drag can be minimised. It is also possible to improve the arrangements of some of the masts, such as the viewing periscopes, which may no longer need to be pressure hull penetrating, the snorkel, with its need to provide large volumes of air, can hardly be reduced in cross sectional size. But it could be properly streamlined.

Any all-encasing streamlined fairing should not extend above the waterline where it might increase the chance of detection. Smaller streamlined extensions would be needed above the water.

References: 1) Aspects of Submarine Design By Prof. P N Joubert.
2) Concepts in Submarine Design by Burcher & Rydill.

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Your Life Ahead....

How to make an impact in an interview??

Interviews are always unpredictable and little scary but you can do well even if you are attending an interview for the first time. You have to build up a confidence inside you and you have to support yourself at the time of interview.

So when you get an interview call then take care of the followings

- First of all do some research about the company. This will give you an idea about the work domain of the company and you get a direction to prepare yourself for the interview. Now, start gathering relevant information and prepare yourself for technical questions. This will give you confidence and you will start to feel that now you can answer anything.

Once you are prepared for technical questions prepare for some common questions. These are the very basic questions which can be asked during your interview:

- **Tell me about yourself?** : Most of the interviews start with this question. So introduce yourself staring with your name, native place, qualifications, experiences, interests/hobbies. Don't spend more than 2 minutes on this.
- **What do you know about our company?** : You remember what information you gathered about this company. So speak out the things you learned about the company during your preparation.
- **What can you do for us that someone else can't?** : Speak out your strengths.
- **What do you look for in a job?** : Honestly speak out your objective and what you are looking for.
- **What are your career goals?** : You have to prepare for this question yourself.
- **What are your strong & weak points?** : Prepare for this question by evaluating yourself.
- **What position do you expect to have in 2 to 5 years?** : Again it is a self assessment question and you have plan for next 2 to 5 years based on your capabilities.
- **How much salary you are expecting?** : This is a very difficult question and in many cases you would not get a job because you would have asked more salary than employer had fixed for this position. So it is better to request for an offer (i.e. let the employer tell you his offer) then only comment on it or negotiate on this.

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- **Do you have any question for me?** : At the end of interview you will be asked this question. And you have to be prepared for this question. You can prepare so many questions like "What exactly is this position?", "What will be roles and responsibilities for this position?", "Would I be assigned to a specific department?", "Typical timings of job work?", "Describe the typical first year assignments for this position, "How my performance will be evaluated".

Before starting from home you have check the followings:

→Dress up well in formals.
→Better to wear a tie if you feel comfortable otherwise don't wear it.
→Check your shoes they should be polished well. Black or brown.
→Collect your all certificates and put them in a file properly and take them along with you.
→Keep a small note book in your file. In case you need to note down something during interview.
→Put your pen safely in your front pocket.
→Start at a time so that you can reach at your interview place before 15-20 minutes of your schedule.

From the time when you enter into the interview room, take care of the following:

→Greet everybody in a friendly manner.
→Don't sit down until you are invited to.
→Take care of your posture, voice, jitters.
→Maintain eye contact with your interviewer & show confidence.
→Don't play with your hair, clothing, pen or notebook etc.
→Pay full attention to interviewer and present yourself like you are very much interested in giving this interview and you are enjoying in giving this interview.
→Try to bring interviewer on a subject where you have good command.
→Listen carefully what interviewer is asking and if you don't understand question completely then take an excuse and ask to repeat the question again.
→If you don't know answer then you can say that you don't know the answer.

These simple tips should help you prepare & be successful at the interview.
All the Best!!

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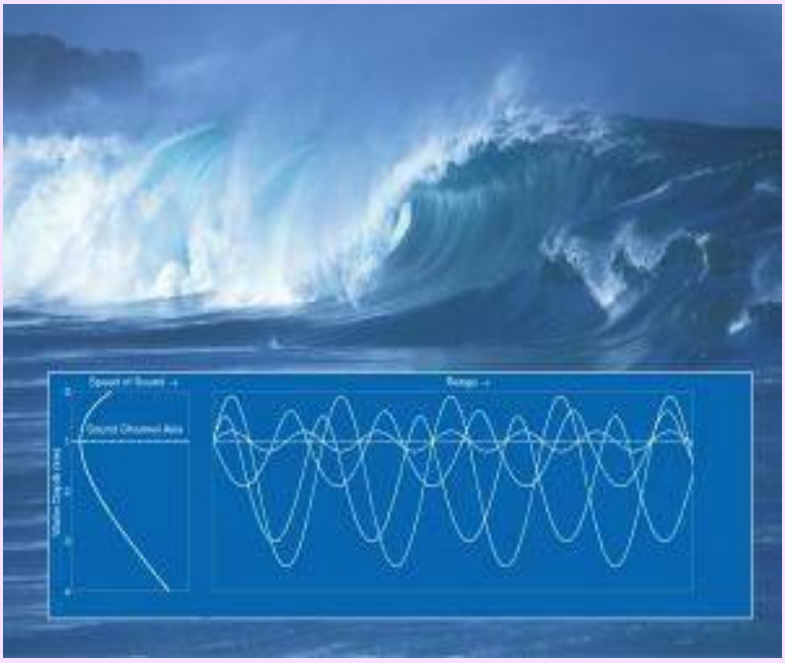
References: Articles on Interview preparation in newspapers like Times of India, The Hindu, Indian Express.

Carbon Effects on Ocean Acoustics

Explore this unique phenomenon through the article by Dilip Singh, a 3rd Year B. Tech (NAOE) student.

It is a commonly known fact that human carbon dioxide emissions are warming the planet. This rising amount of CO2 is being absorbed by the oceans, thus increasing seawater acidity (lowers the seawater pH). This process, termed 'ocean acidification', has received growing scientific and public interest because it threatens certain groups of marine organisms.

Recently researchers have found out that man-made carbon dioxide not only warms and acidifies the ocean – it also affects acoustical properties of seawater, making it more transparent to low-frequency sound. Reports also suggest that seawater sound absorption will drop by up to 70% during this century. Scientists have examined the effects of man-made carbon dioxide under usual emissions and have generated projections of the magnitude, time scale, and regional extent of changes in underwater acoustics due to ocean acidification.



How does this occur??

When carbon dioxide dissolves in seawater, it produces carbonic acid and increases the hydrogen ion concentration (acidity). The seawater pH has declined by about 0.1 units corresponding to about 25% increase in acidity. These changes may appear small, but pH is measured on a logarithmic scale – analogous to the Richter scale, which measures the strength of Earthquakes. For example, a drop of pH by one unit implies a ten-fold increase in acidity. **Low-frequency sound absorption depends on the concentration of dissolved chemicals such as boric acid, which in turn, depends on seawater pH.** This is the reason why changes in seawater pH affect ocean acoustics.

For example, the middle C of the piano is tuned to 261.6 Hz; in the ocean, sound around this frequency is produced by natural phenomena such as rain, wind, and waves by marine mammals, and by man-made activities such as construction, shipping, and use of sonar systems.

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Most people know that when they turn on the air conditioner or drive a vehicle, they emit carbon dioxide, which causes climate change and ocean acidification. The surprise now is that it also affects sound absorption in the ocean. What is happening over time is that the low frequencies become louder at distance.

Areas with large sound absorption reduction and intense noise sources. The largest changes are projected to occur in the surface ocean waters in high latitudes, for instance, in the North Pacific and in the Southern Ocean, and in the areas of deep water formation such as the North Atlantic, where man-made CO2 invasion is the greatest.

Sound can travel farther at depth of about 1000 m (the depth of the so called deep sound channel) than at the surface. Most of the natural sounds are generated at the surface, but they can leak into the deep sound channel, bend there, and travel over thousands of kilo meters in the ocean. With time, as anthropogenic CO2 penetrates into the deep ocean, the changes in sound absorption will also propagate well below the deep sound channel axis. Sound absorption will continue to decrease even after reductions in CO2 emissions because ocean pH will continue to decrease.

Marine mammals also rely on low-frequency sound to find food and mates. Hence, ocean acidification may not only affect organisms at the bottom of the food chain by reducing calcification in plankton and corals, but also higher trophic level species, such as marine mammals by lowering sound absorption in the ocean.

We don't fully understand what the impacts of these changes in ocean acoustics will be. Because of decreasing sound absorption, underwater sound could travel farther, and this could lead to growing noise levels in the oceans. Increasing transparency of the oceans to low-frequency sounds could also enable marine mammals to communicate over longer distances. The scientists say that further research is needed to address these questions.

References: Various books on Ocean Acoustics. Future Oceans becoming transparent to low frequency sounds due to carbon di oxide emissions - University of Hawaii at Manoa.

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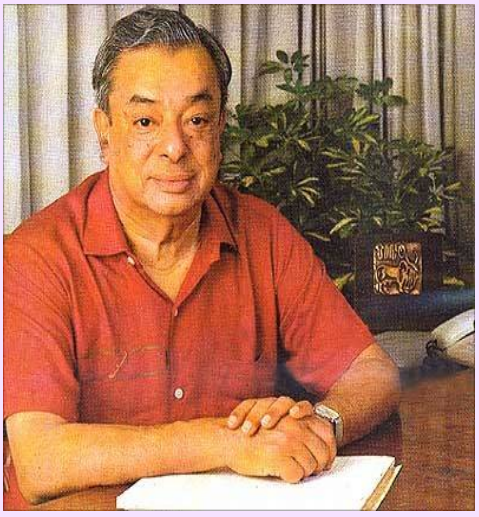
Milkman of India - Dr. Kurien

La Ola's tribute to the man who made AMUL

India was a milk deficient country back then.....it all changed after operation flood.



Operation Flood in India, a project of the National Dairy Development Board (NDDB) was the world's biggest dairy development programme which made India, a milk-deficient nation, the largest milk producer in the world, surpassing the USA in 1998, with about 17 percent of global output in 2010–11, which in 30 years doubled the milk available per person, and which made dairy farming India's largest self-sustainable rural employment generator. All this was achieved not merely by mass production, but by production by the masses.

Amul a single cooperative dairy was the engine behind the success of this program. Verghese Kurien was then the Founder Chairman of NDDB and his mentor Tribhuvandas Patel his mentor was the Chairman of Amul. Kurien gave the necessary thrust using his professional management skills to the programme, and is recognised as its architect.

Born on 26th November 1921, Dr. Kurien was an engineer and a social entrepreneur. He is best known as the "Father of the White Revolution" for his 'billion litre idea' of operation flood.

He graduated in Physics from Loyola College, Madras in 1940 and then obtained his Bachelors in mechanical engineering from the University of Madras. After completing his degree, he joined theTata Steel Technical Institute, Jamshedpur from where he graduated in 1946.

Later, as Kurien would say in his own words, "I was sent to the United States to study dairy engineering at Michigan State University. I cheated a bit though, and studied metallurgical and nuclear engineering, disciplines that I believed were likely to be of far greater use to my soon-to-be Independent country and, quite frankly, to me."

He trained for dairy technology on a government sponsorship to New Zealand, a bastion of cooperative dairying then, where he learnt to set up the Amul Dairy.

He didn't respond to any political interference he was unperturbed by bureaucratic disturbances and proceeded to achieve his pioneering model of co-operative business.

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He founded around 30 institutions of excellence which are owned and managed by farmers and run by professionals. One of these institutions was 'AMUL' which is an acronym of Anand Milk Union Limited. As the founding chairman of Gujarat Co-operative Milk Marketing Federation (GCMMF) he was responsible for the creation of the Amul brand of Dairy products.

A key achievement at Amul was the invention of milk powder processed from buffalo milk (abundant in India).

His achievements with Amul Dairy caught the eye of Prime Minister Lal Bahadur Shastri who made him the chairman of NDDB to replicate the Anand model all over India.

One of the greatest proponents of the cooperative movement in the world, his work has alleviated millions out of poverty not only in India but also outside. Hailed as the "Milkman of India", Kurien won several awards including the Padma Vibhushan (India's second-highest civilian honour), the World Food Prize and the Magsaysay Award for community leadership.

Operation Flood has created a national milk grid linking milk producers throughout India with consumers in over 700 towns and cities, reducing seasonal and regional price variations while ensuring that the producer gets a major share of the price consumers pay, by cutting out middlemen. By reducing malpractices, it has helped dairy farmers direct their own development, placing control of the resources they create in their own hands.

This Great Son of India breathed his last on September the 9th, 2012.

The milkman died but has left an immortal legacy to all Indians.....he set a unique example where entrepreneurship meets public welfare. **R.I.P. Sir.**

References: 1) An Unfinished Dream by Dr. Verghese Kurien, 2) I Too Had a Dream by Dr. Varghese Kurien & Gouri Salvi, 3) Various Articles in Newspapers like Times of India & The Hindu.

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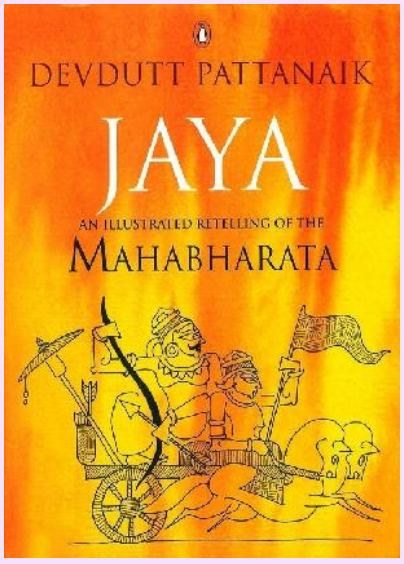
KILL YOUR TIME...

MOVIE REVIEW - 'BLACK SWAN'

Skillfully mastered with an appalling storyline, "Black Swan" tells the story of a ballerina who fights her girlish charm to portray the dark side of her personality & achieve 'perfection' on stage.
The movie – 'Black Swan' is richly sensual, enjoyable and it is such a fascination to see Natalie Portman surrender to the madness and watch her evolve from the pretty, soft & kind 'Swan Queen' to the dark, seductive & manipulative 'Black Swan' The movie directed by Darren Aronofsky is a masterpiece in its own style. It is the perfect portrayal of the human psyche which has two sides, the evil which always wants to overthrow the good within ourselves.



MUST READ- JAYA AN ILLUSTRATED RETELLING OF THE MAHABHARATA (DEVDUTT PATTANAIK)

Devdutt Pattanaik a Doctor turned mythologist retells the greatest poem ever told- THE MAHABHARATA. The book is designed for all classes of reader's people who know nothing about the epic can look into it and those who claim to know everything about the epic can test their knowledge as it contains many tales which are unheard to many.
Go for it because - If you Read it carefully you will be someone better in the end.

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CAMPUZZZZ.....

- Painting, Sketching & Rangoli Making Competitions were organized between the students of the various houses. The events saw a wonderful portrayal of talent in the campus.

- The birthday of our beloved Director Prof. S C Misra was celebrated by students on 12th September, 2012. The Director thanked all the students & expressed his happiness and surprise.

- Chess Championship is underway. The matches have seen a huge turnout of excellent talent. Latest Scores & updates can be followed at La Ola Facebook Page & La Ola website.

- Students of 3rd Year B.Tech (NAOE) & 1st M.Tech (NAOE; Dredging & Harbor Engg.) visited The Hydrodynamic Test Facilities at the Naval Science & Technological Laboratory (NSTL) Visakhapatnam on 18th & 19th September, 2012, as part of their Hydrodynamic Lab.

- The Commissioner of Police - Visakhapatnam City Mr. Purnachander Rao, IPS visited the campus & interacted with the students. The students found the discussions extremely interesting.

- A talk on 'Copyright Laws & Plagiarism (Part I)' was given by Mr. A Ramesh Kumar (Secretary cum PAO - IMU Visakhapatnam Campus) on 28th September, 2012. The talk was extremely interesting & informative. Students also had a very interactive session.

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CAMPUZZZZ.....

- Teachers Day was celebrated in the University Campus on 5th September, 2012. Director Prof. SC Misra wished all the teachers. A 'Musical Chair' event was organized for the Faculty Members. Mrs.Padmashree (Librarian) emerged the winner.

- The Website & Facebook Page of La Ola was launched by the Director Prof. S C Misra on 5th September, 2012. He addressed the students & congratulated the former Chief Editor Bikram Senapati and his team for their efforts over the last 2 yrs. He also congratulated the new Chief Editor Anish Chacko & his team on assumption of office.

- The 'Introductory Gathering - 2012', was organized on 10th September, 2012 to welcome the new batch of students to the IMU Family. Director Prof. S C Misra & Visiting Faculty Prof. R P Gokarn were presented with Lifetime Membership of NASS.

- The much awaited Leagues of the campus have kick-started. The Institute Football League (IFL), Institute Cricket League (ICL) & Basketball League (BBL) have started off in the second week of September. La Ola will exclusively cover the matches & provide the latest information through their Facebook Page as well as website.

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