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To Whom It May Concern

The following documents are related to Criterion 3.3.3 - Books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during the year (July, 2, 2023-June 30, 2024).

Dr. Manas Kabi
Principal
Asutosh College

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Title: Indian Contemporary Films and Societal Reflection
by
Noveena Chakravorty, Sharmila Kayal, Sayak Pal

Names: Chakravorty, Noveena, editor | Kayal, Sharmila, editor | Pal, Sayak, editor |

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Subjects: Contemporary Films | New Age Films | Gender representation | Society | Art and Industry | Indian Cinema | Casteism | Indian Film | OTT | Hindi Films | Relationship | Comparative Study | Women in Movies | Social Media Influences | Animation Movies | Societal Reflection.

This book is essential for students and faculty of Media and Communication, social sciences, Film studies, and Entertainment genre to understand the New Media Landscape and Dimensions from the theoretical and practical perspective in the Indian context. The chapters in this book will surely provide valuable understanding to both social scientists and policymakers interested in the subject provided by the publisher.

Price: ₹ 750

CHAPTER - 7

From Society to Screen: Exploring casteism in Indian films

Dr. Debastuti Dasgupta, *Assistant Professor, Department of Journalism and Mass Communication, Asutosh College, University of Calcutta*

Soumyadeep Sarkar, *Student, Department of Journalism and Mass Communication, Asutosh College, University of Calcutta*

Abstract

This chapter explores the portrayal of casteism in contemporary Indian films, both as a reflection of social realities and a catalyst for societal transformation. Casteism, an entrenched hierarchical system, continues to breed discrimination and social exclusion based on birth in India's cultural heritage. Bollywood, a potent medium for storytelling and cultural representation, has embraced the task of confronting this pervasive issue.

The chapter delves into the historical roots and evolution of casteism, highlighting the discrimination faced by marginalized communities, particularly Dalits. It examines how modern films, illustrated by case studies of movies like "Jai Bhim" (2021), "Karnan" (2021), and "Sarpatta Parambarai" (2021), depict the struggles of these communities. It is discovered that these cinematic narratives courageously tackle societal taboos, foster acceptance, amplify marginalized voices, and bridge the empathy gap, emphasizing Indian cinema's role in reshaping societal perceptions. It acts as a mirror reflecting the nation's political and social realities, often using satire and commentary to highlight systemic flaws and stimulate critical reflection.

Thus, Indian cinema stands as a force of social commentary, weaving stories that capture the intricacies of contemporary society. With the responsibility of challenging norms, advocating for change, and promoting empathy, it addresses casteism while shaping social consciousness.

Keywords: *Caste, Bollywood films, caste-based discrimination*

Introduction

India is a country known for its rich cultural heritage, diversity, and intricate social fabric. Within this tapestry, the issue of casteism has persisted as a deeply rooted social problem. Casteism refers to the hierarchical division of society based on birth, where individuals are born into specific castes and are subjected to varying degrees of privilege, discrimination, and

CAREER GUIDANCE : CHOICES BEFORE YOU

Edited by

Dr. Manas Kabi
Principal

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ASUTOSH COLLEGE

Career Guidance : Choices before you

(A volume on career options for college students)

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PREPARING FOR INTERVIEW

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JOB INTERVIEW: HIGHLIGHTS

What is a Job Interview?

A formal meeting in which an applicant is asked questions to determine their suitability for a particular job is job interview. The **purpose of a job interview** is to determine if the applicant in front of you is qualified for the **position** for which he or she is applying, and if the individual would be a good fit for your company.

...Augmented Reality and Virtual Reality in the ...ield of Journalism: A Game Changer

Dr. Debastuti Dasgupta

Introduction

In recent years, Augmented Reality (AR) and Virtual Reality (VR) have become increasingly popular in various industries, including the media industry. AR is particularly well-suited to the media industry, as it allows for the integration of digital content into the real world. This can be done through the use of mobile devices, which can overlay digital content onto the user's physical surroundings, or through dedicated AR headsets, which offer a more immersive experience. VR, on the other hand, offers a fully immersive experience, transporting users to a virtual world where they can explore and interact with digital content. VR is particularly well-suited to gaming and entertainment applications.

These immersive technologies have the potential to revolutionize how journalists gather, report, and disseminate news, as well as how audiences consume and interact with it. They are transforming the way we consume and interact with media content. With the increasing popularity and accessibility of AR and VR devices, the media industry is starting to explore new ways to incorporate these technologies into their content creation and distribution strategies.

In this paper, the researchers will explore the current state and future of AR and VR in journalism, focusing on their benefits and challenges, as well as their potential impact on the field. The paper will also explore the inclusion and scope of AR and VR in the media industry, looking at how these technologies are being used and their potential future impact.

Literature Review

Scope of AR and VR in the Media Industry

AR and VR have the potential to transform the media industry by offering new ways to create

Tollywood's Tryst with Digital Media

Film Marketing Redefined

Dr. Debastuti Dasgupta

Tollywood's Tryst with Digital Media: Film Marketing Redefined

Edition First

Author

Dr. Debastuti Dasgupta

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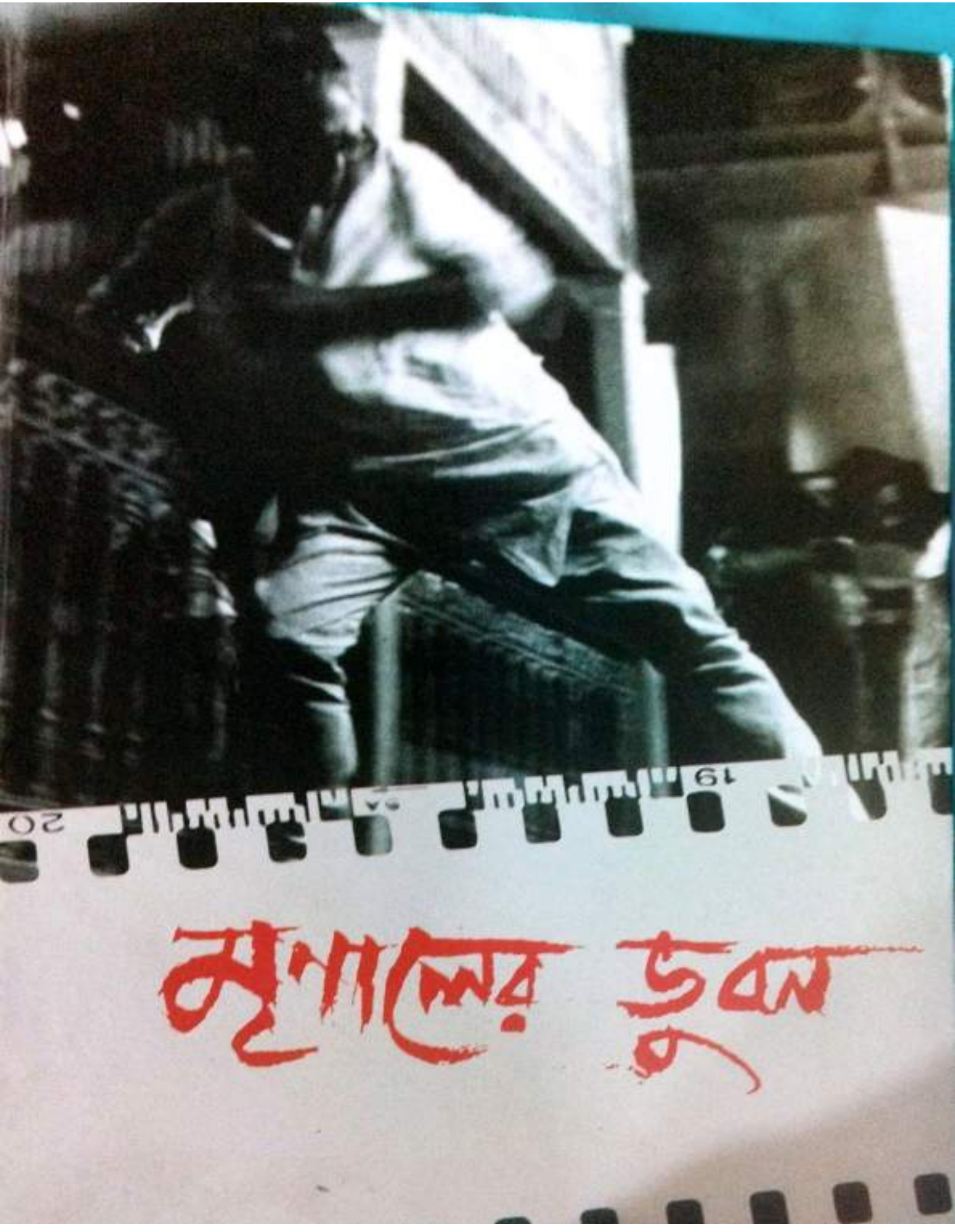

Mrinaler Bhubon
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৮০০ টাকা

ফিরে দেখা আকাশ কুসুম-কে

দেবস্তুতি দাশগুপ্ত
প্রিয়াঙ্কা রায়

মৃণাল সেনের জন্ম শতবর্ষ চলছে। এই সূত্রে আবার তাঁর ছবিগুলি দেখা হল। প্রথম যে ছবিটি দেখতে দেখতে মনে হল এই ছবি নিয়ে একদা স্টেটসম্যান পত্রিকায় সমালোচনা বার সঙ্গে মৃণাল সেন ও চলচ্চিত্রের কাহিনিকার আশিস বর্মনের দীর্ঘ পত্র বিনিময় হয়েছিল শুধু, তবে একাডেমিক মহলে ছবিটি নিয়ে লেখালেখি হয়েছে যৎসামান্য। তবে ফিরে দেখতে গিয়ে এটিও বুঝলাম যে আকাশ কুসুম মৃণাল সেনের বর্ণময় চলচ্চিত্র জীবনের প্রথম পর্বের একটি অত্যন্ত গুরুত্বপূর্ণ ছবি, যা কিনা আজকের দিনেও যথেষ্ট প্রাসঙ্গিক। আশিস বর্মনের কাহিনি অবলম্বনে ১৯৬৫ সালে তৈরি ছবি আকাশ কুসুম।

লিখতে গিয়ে প্রাসঙ্গিক হয়ে পড়ছে কতগুলি কথা, যা প্রথমেই বলে নেওয়া ভালো। ভারতবর্ষে ব্রিটিশ উপনিবেশের পত্তন ও বিকাশ হয়েছিল এই বাংলায়, আরও নির্দিষ্টভাবে বলা কলকাতায়। তাই ইউরোপীয় শিক্ষা ও সংস্কৃতির সঙ্গে বাঙালিদের পরিচয় সর্বাগ্রে। ইউরোপে উদারনীতির হাত ধরে যেমন একদিন ইউরোপে সাম্যবাদের চিন্তা সে দেশগুলিতে বিকশিত হয়েছিল, সেভাবে বাংলাও ভারতের অন্যান্য প্রদেশগুলোর তুলনায় রাজনৈতিক পালাবদলের সঙ্গে সামাজিক পালাবদলের চিন্তাও খানিক আগেই প্রসার পেয়েছিল, যার ছায়া এসে পড়েছিল বাংলা গল্পে, উপন্যাসে, কবিতায় এবং সিনেমায়। কখনো প্রচ্ছন্নভাবে কখনো বা সরাসরি।

মৃণাল সেন ভালোবাসেন ভাঙতে, চিরায়ত তথাকথিত সুন্দরকে তিনি ক্যামেরার তাপে দুমড়ে মুচড়ে দেন। মৃণাল সেনের ছবিগুলিকে আমরা যদি প্রতিক্রিয়া-বিরোধী ছবি বলে অভিহিত করি, সমাজ বিশ্লেষণের ক্ষেত্রে যা নাকি শ্রেণি দৃষ্টিভঙ্গিকে প্রাধান্য দেয়,তবে বলতে হয় আকাশ কুসুমে আছে তারই প্রতিফলন – প্রেম যতই গভীর ও সুন্দর হোক শ্রেণিগত সীমাটা কিন্তু সে সহজে নিতে যায়। প্রেম অজর-অমর তো নয়। মানিক বন্দ্যোপাধ্যায় যেমন একটু অন্য প্রসঙ্গে এরকম একটি কথা বলেছিলেন – 'প্রেম যদি চিরকাল টিকিত মানুষকে আর টিকিতে হইত না।'

CRITICAL STUDIES *in* SCIENCE

VOLUME 1

Edited by
Dr. Sayani Mukhopadhyay
Dr. Asish Kumar Das

Section IV: Physical Science

CHAPTER 1
Theoretical aspects of dielectric properties of ferroelectric and anti-ferroelectric liquid crystal: A brief Review

Dr. Surjya Sarathi Bhattacharyya*
Assistant Professor, Department of Physics
Asutosh College, Kolkata

Abstract:

Polar liquid crystals are interesting not only because of their application in fast-switching flat panel displays and other electro-optic devices, but also because of their intriguing physical characteristics motivating fundamental research. In this paper, an introduction to basic theories concerning the dielectric response of polar liquid crystals is presented.

Key Words: Dielectric, Liquid Crystals, Impedance spectroscopy.

Introduction:

Dielectric materials are those in which electric fields can continue to exist for a significant amount of time. These materials exhibitvery high electrical resistivity and therefore contrasting characteristic is shown in their fundamental electrical properties from those of conductive materials.

In this paper, a short review of dielectric characteristics of liquid crystals (LC) is presented. To do this, we consider the long-range order of LC molecules, their number per unit volume, and mutual or reciprocal action between molecules, which influences the molecular characteristics. The dielectric performance of liquid crystals represents the collective behavior of mesogens and their molecular responses, the pre-existing coupling between the polarization at the macroscopic scale,and the molecular reaction by the internal field. As a result, the molecular illustration of the dielectric characteristics of LC phases necessitates the identification of the internal electric field in anisotropic surroundings, which has been performed in the literature survey.

Dielectric medium (Liquid Crystal)

The dielectric characteristics of LC's represents the collective reaction of mesogens and their molecular behavior, and pairing between the polarization in macroscopic scale and corresponding response in molecular level through the internal field.

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Materials science is an interdisciplinary field of researching and discovering materials. It is the study of the properties of solid materials and how those properties are determined by a material's composition and structure. This book contains five chapters. The first chapter demonstrates the importance of nano-fertilizer. The second chapter briefly tells about 3D printing. The third chapter shows polymer perovskites composites for energy applications. The fourth chapter demonstrates the novelty of antimicrobial peptides as an emerging materials for antibiotics. The fifth chapter describes about aluminium along with its novel properties and applications.

Dr. Ujjal Kumar Sur works as Associate Professor in the Department of Chemistry, Behala College, University of Calcutta, Kolkata, West Bengal, India. His research interests are electrochemistry, self-assembled monolayers of organic molecules, microwave chemistry, nanotechnology and surface-enhanced Raman spectroscopy, materials science.

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Novel Materials

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Modern Trends in Materials Science Research

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Contents

Chapter 1

Nano-fertilizer: A distinctive entreaty of nanomaterials to crop field

Abstract:

Fertilizers are very important for plant growth and development. However, most of the applied fertilizers are rendered unavailable to plants due to many factors, such as leaching, degradation by photolysis, hydrolysis, and decomposition. Hence, it is necessary to minimize nutrient losses through fertilization and to increase crop yield through the exploitation of new applications with the help of nanotechnology and nanomaterials. Higher plants, as sessile organisms and as the best ecological receptors of our environment, have an amazing capability to develop versatile mechanisms to perform better under suitable as well as adverse conditions.

Interactions of plants with nano-fertilizers include uptake, translocation, and accumulation of nanoparticles depending on the nature of plant species as well as their shape, size, type, chemical composition, functionalization, and stability in the nano-fertilizers.

In agricultural-based countries like India, any kind of positive strategy for agricultural purposes will no doubt be helpful to farmers. Under these circumstances, incorporating nanoparticles in the nano-fertilizer and its application in the crop fields will open a new window in agricultural sectors which will help to fight against the huge food demand of the ever-growing population.

Keywords: bio-compatibility, bio-fertilizer, conventional fertilizer, crop yield, inorganic fertilizer, Nano-fertilizer, nanoparticle, Nutrient use efficiency, organic fertilizer, plant growth

CHAPTER 9
Chaos: complexity determination and generation

Dr. Sourav K. Bhowmick*
Assistant Professor, Department of Electronics
Asutosh College, Kolkata

Abstract:

One form of complexity is chaos found in nature. The basic property of chaos has been studied in two popular chaotic systems. For validating the theoretical study the said systems were implemented in electronic circuits. The way of implementation has been described. The theoretical and experimental results have been presented. Some applications are also shown.

Key Words: Complex Systems, Nonlinear dynamics, chaos, Electrical Circuits

Introduction:

Over the last decade physicists, mathematicians, astronomers, biologists and scientists, from many other disciplines, have developed a new way of looking at complexity in nature: it is called the theory of chaos. Chaos can be mathematically defined as 'randomness' generated by simple deterministic systems [1]. Poincare was the first person to glimpse the possibility of chaos [2], in which a deterministic system exhibits aperiodic behaviour that depends on sensitivity of the initial conditions.

In 1963, Edward Lorenz (1917-2008) discovered the chaotic motion. Lorenz's work had little impact until the 1970s, the boom year of chaos. After that many people find chaos in nature [3].

Chaos is apparently unpredictable behaviour arising in a deterministic system because of great sensitivity to initial conditions. Chaos arises in a dynamical system if two arbitrarily close starting points diverge exponentially, so that their future behaviour is eventually unpredictable [2]. Chaos can be determined by some properties.

Extreme sensitivity to initial conditions: Small changes initial conditions may lead to dramatically different long term behaviour. Such sensitivity leads to loss of long term predictability even if the system is completely deterministic [1].

Three dimensional system: One or two dimensional dynamical systems cannot become chaotic. For three or more dimensional system are chaotic system [1].

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CHAPTER 10

Topological Insulators : The Newest Wonder Materials

Dr. Rabia Sultana*

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Abstract:

Recently, the discovery of topological insulator materials has fascinated the entire condensed matter physics community. Some of the popular topological insulators are bismuth telluride (Bi_2Te_3), bismuth selenide (Bi_2Se_3) and antimony telluride (Sb_2Te_3). In the present paper, first a brief discussion of the topological insulators will be presented, in terms of how the same was envisaged by theoreticians and later realized by experimentalists. Initially, the two dimensional semiconductor electron gas was studied followed by the quantum Hall effect to quantum spin Hall effect. Further, the two dimensional and three dimensional topological insulators with time reversal symmetry properties were studied. The topological insulator materials are insulating in the bulk and conducting at the surface due to time reversal symmetry protected states. Summarily, this article discusses the exciting novel material, where topology, surface states and dimensionality of conduction channels control electronic properties. A host of physical properties including X-ray diffraction, unit cell structure, Dirac cone, quantum oscillations, weak localization and anti-localization effect, electronic band sturcture, electrical resistivity and magneto-resistance of quality topological insulator crystals will be discussed.

Keywords: Magneto-resistance, Quantum oscillations, Topological insulators, Crystal growth,

Introduction:

The discovery and ongoing research of topological insulators with unique properties have attracted much attention from condensed matter researchers worldwide [1-4]. TIs are exclusive materials exhibiting both bulk insulating states and mass-less Dirac-cone like surface states protected by time reversal symmetry, significant for futuristic novel applications such as practical quantum computers, spintronics, low–dissipation electronics, optoelectronics, superconductors and many others [1-4]. Additionally, topological insulators behave as excellent thermoelectric (TE) materials due to the presence of analogous material features such as heavy elements and narrow band gaps [1-4]. Some of the unique properties of topological insulators include existence of narrow band gap,

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Are Religious Fundamentalism and Caste-based Reservation Shuddering the Basic Fabric of Indian Democracy? Some Observations

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Abstract

India is a land of diverse religions, cultures, and castes. Muslims, Sikhs, and Christians are the minority communities in India. Within a short time of independence contours of Muslim politics changed from secular and nationalistic to largely parochial and conservative. On account of Orthodoxy, Illiteracy, conservatism, and different social customs the Muslim community did not mingle with mainstream national politics. They believe that adequate opportunities have not been made available for the upliftment of their community. Hindus, who are the majority, have begun to look askance at the Muslims. The minority Muslim community was petrified by communal riots in Gujrat and other sensitive parts of the country. Muslim religious leaders severely lambasted Indian pseudo-secularism and lack of representation of this community in government posts and services. Some political parties started indulging in vote bank politics by pampering religious minorities and making an appeal to the electorates based on caste, communal and linguistic lines.

Weaker sections of society like scheduled castes, scheduled tribes, and other backward classes have been living in deplorable conditions for a long time. In the Constitution, some special privileges have been granted to these communities in the form of reservation of seats in the legislature, institutions of local self-government, and government services and educational institutions for their upliftment. But still, they are clamoring for more rights and privileges. Subversive and separatist activities of the minority community and backward classes may shatter the foundation of Indian democracy. The Endorsement of support to these communities by some political parties for garnering political interest has deleterious consequences for Indian democracy

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Edited by:
Dr. Manas Kabi
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CAREER PROSPECTS IN GEOINFORMATICS IN INDIA

Dr. Subhadip Gupta

Assistant Professor, Department of Geography
Asutosh College, Kolkata

Introduction: Development of Geoinformatics

Technology pertaining to the nature and organization of spatial and non-spatial data is referred to as geoinformatics. Several aspects of geoinformatics include techniques for gathering data, both digital and analog, organizing, classifying, and qualifying information, managing it, displaying it, and disseminating it, together with the infrastructure required for the best possible use of the data. The primary focus of geoinformatics applications is the management of the natural and artificial environments, as well as the items that are associated with them, in the real world. The field of geoinformatics is a synergy of many disciplines (https://isgindia.org). From the French word "géomatique,", the word "geomatics" is derived. The terms "geo" (Earth) and "informatics" This phrase was originally used in writing at the Ministry of Equipment & Housing in France in the early 1970s. A few years later, in Canada-more especially, in the French-speaking Province of Quebec-the term "géomatique" was reimagined to represent the contemporary perspective that was spreading among the fields that collected, processed, and disseminated spatial data, including surveying, photogrammetry, geodesy, remote sensing, cartography, and GIS. A comparable term, geomatics, also refers to geoinformatics, but with a stronger emphasis on surveying (Bedard et al., 1987). While geoinformatics appears to be more popular in Europe, particularly in the Netherlands where the renowned ITC

Career Guidance : Choices before you

(A volume on career options for college students)

Edited by
Dr. Manas Kabi
Dr. Chandramalli Sengupta

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Influence of Panchatantra in South East Asia

*Dr. Somnath Das
**Modhurima Mukharjee

A review of the history of India shows that people have derived knowledge from Artha Shastra and Niti Shastra for leisure and entertainment in their personal lives, and sometimes people have chosen stories for entertainment and pleasure of mind. The stories are heart-warming through the various stories of the time and the beautiful presentation of those stories. I can remember the Rigveda, Purana, Ramayana, and Mahabharata as sources of stories in the history of India. But the Panchatantra is the most ancient and traditional well-known story of various animals and birds in the later Sanskrit literature. The story of Panchatantra has been translated into more than 50 languages. The book is named Panchatantra as it is written on five themes. The author of this great, heart-warming storybook is the great Pandit Vishnu Sharma. The book's glory was not limited to India only for its sweetness of story and for touching the hearts of people with morals through stories. Later, the translated story of this book outside India and abroad also helped to shape the thinking power of human life to a new level. This story book is popular among all. Among the foreign countries, this book has brought the reflected most to the region of South-East Asia. Various books of Panchatantra translated into different languages makes people happy. The influence of Panchatantra was very important in various places like Thailand, Cambodia, Indonesia, etc. in South East Asia.

People's emotional bond with stories has inspired people equally since ancient times. At different times, stories have occupied a place in people's hearts in such a way that it can be understood why the glory of Panchatantra has increased a lot.

আগমনী ২০২৩

সম্পাদনা

ড. মানস কবি

অধ্যক্ষ

আশুতোষ কলেজ

আগমনী ২০২৩

সম্পাদনা
ড. মানস কবি

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সহকারী অধ্যাপক, সংস্কৃত বিভাগ

ভারতীয় সংস্কৃতি ভাবনায় পূজা অর্চনার দিকটি খুবই প্রসিদ্ধময় । দেব-দেবীর আরাধনায় মগ্ন থেকে আমরা উৎসবে নিয়োজিত থাকি বাঙালি তথা ভারতীয়রা । তাই কোথাও যেন আমাদের অন্তঃস্থল এর মধ্যেও আমরা পূজার সন্ধান পেয়ে থাকি। এই ভাবনাবোধ কিন্তু হঠাৎ বা কিয়ত্কাল পূর্বেই অনুষ্ঠিত হয়নি। পৌরাণিক যুগে অর্থাৎ বিবিধ পুরাণের মধ্যেও কিন্তু আমরা পূজার উল্লেখ পেয়ে থাকি। বৈদিক যুগে বিবিধ সূক্তে আমরা দেবতার স্তুতি পরিচয় পাই। এই বিবিধ সূক্তের সমারোহে আমাদের মধ্যে যেন এক আধ্যাত্মিক জগত তৈরি হয়ে থাকে । কাজেই অধ্যাত্মচেতনায় আমাদের জাতীয় চেতনার উন্মেষবোধও ঘটে। বলাবাহুল্য এহেন ভাবনাবোধ আমাদের সংস্কৃতি তথা কৃষ্টি বোধের পরিচায়ক ও বটে। বাঙালির জীবনে আদ্যোপান্ত ঘিরে আমরা যে পূজাকে দেখতে পাই তাহলো দুর্গাপূজা। দুর্গাপুজোর ভাবনা বৈদিক ও পৌরাণিক যুগে কেমন ছিল? তখনও কি এমন মহাসমারোহে পূজা প্রচলন ছিল ? পুরানে ও কি তেমনভাবে এই পূজা ও পদ্ধতির কথা বলা হয়েছে? এহেন বিষয়ক তথ্য এই গবেষণাপত্রে লিপিবদ্ধ করা হয়েছে।

সূচক শব্দ: পদ্ধতি,সংস্কার,রূপ,বিবর্তন।

গবেষণাপত্রটিতে পৌরাণিক ও বৈদিক যুগের দুর্গাপূজার বিবিধ পদ্ধতি তথা নিয়মের বিষয় খুবই সুন্দরভাবে লিপিবদ্ধ হয়েছে। পূজার যাবতীয় আচার-আচরণে বিষয়টি জাতীয়গত সংস্কারের সঙ্গে যে কতখানি সম্পৃক্ত, তাও এখানে দেখানো হয়েছে।অধ্যাত্মচেতনায় বিকশিত মনের পরিসর বহুদূর পর্যন্ত বিস্তৃত হয়ে ধাবিত হয় কিংবা অধ্যাত্মচেতনায় নিয়োজিত মনে বিবিধ রূপে প্রকাশ পরিলক্ষিত হতে দেখা যায় , সাধনা স্তর বিষয়ে যদি পূজা অর্চনা কে অন্তর্ভুক্ত করা হয় ,সেখানেও কিন্তু রুপের বিবিধতার সমাবেশ দৃষ্ট হয়।পরিবর্তনশীল এই জগতে সবকিছুর মধ্যে পরিবর্তন দৃষ্ট হয়, পৌরাণিক ও বৈদিক যুগে পূজা অর্চনার সময় পর কোন কোন বিষয় বিবর্তন তথা পরিবর্তন সাধিত হয়েছে ,সে বিষয় ও গবেষণা পত্রে লিপিবদ্ধ করা হয়েছে।

কালের বিচারে পর্যবেক্ষণ করলে বৈদিক যুগে কিংবা প্রাকবৈদিক যুগে অর্থাৎ অনার্য যুগেও কিন্তু আমরা দুর্গাপূজার নিদর্শন পেয়ে থাকি । দুর্গাপুজোর উল্লেখ ঋগ্বেদে মোটামুটি দৃষ্ট না হলেও তৈত্তরীয় আরন্যকের মধ্যে দুর্গাপুজোর বিষয়ক বহুবিধ তথ্য আমাদের দৃষ্ট হয়। আর আমরা যদি বৈদিক উত্তর পৌরাণিক যুগের দিকে তাকাই সেখানে কোথাও যেন আমরা দেবী দুর্গার সঙ্গে চণ্ডীর একাত্মতা নিদর্শনের পরিচয় পরিলক্ষিত হতে দেখি।কালের বিবর্তনে দেবী দুর্গা পরে চণ্ডী এবং তার ও পরে আমরা উমার উল্লেখ পেয়ে থাকি, এই দেবীর উমা নামে প্রচলনটি অনেকটাই আমাদের বাঙালিয়ানা সঙ্গে যেন একাত্ম হয়ে যায়।

যদি আমরা দুর্গাপূজার পদ্ধতি বিষয়ক দিকের প্রতি লক্ষ্য করি তাহলে দেখতে পাই, বসন্ত ও শরৎকালের দুর্গা পূজার পদ্ধতি তে মন্ত্র তথা উপাচারগতভাবে এই দুই সময় পূজার মধ্যে কোন পার্থক্য পরিলক্ষিত হয় না, তবে মহালয়া ও বোধনে প্রয়োজনীয়তা শরৎকালে পরিলক্ষিত হতে দেখি। পুরাণে কথিত আছে এই বোধন হল আদ্যাশক্তির জাগরণের এক অন্যতম তিথি। ষষ্ঠী তিথিতে বিল্ববৃক্ষে এই তিথি অনুষ্ঠিত হয়ে থাকে । এই অনুষ্ঠানের মাধ্যমে দেবীর বরণ তথা

CAREER GUIDANCE : CHOICES BEFORE YOU

Edited by

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Principal

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JOB INTERVIEW: HIGHLIGHTS

What is a Job Interview?

A formal meeting in which an applicant is asked questions to determine their suitability for a particular job is job interview. The **purpose of a job interview** is to determine if the applicant in front of you is qualified for the **position** for which he or she is applying, and if the individual would be a good fit for your company.

A HANDBOOK ON ACADEMIC ACCOMMODATION FOR STUDENTS WITH DISABILITIES IN HIGHER EDUCATION

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by Dr. Ratan Sarkar, Dr. Sunil Kumar Baskey

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16 Chapter

INCLUSIVE PEDAGOGY FOR STUDENTS WITH DISABILITIES (SWDS) IN HIGHER EDUCATION

Dr. Somnath Das [23]

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Abstract:

Everywhere in the world there is a changing situation. It is needless to say that along with this variability, there are also variations in different areas of the world. This variation is seen to be created in this variation. We witness such variability and diversity within society itself. We also encounter such variation and diversity in the educational environment. If we narrow the issue further, we will see that we are witnessing this issue in our classrooms as well. Every student in the classroom has different mental and physical makeup. But for the progress of education, we need the matching of students from all levels. To take this issue to a more advanced level in work, there is a need for inclusive education. Needless to say, this education is not created for the implementation of the program, but for the implementation of ideals, such education is necessary.

Keywords: Methodology, Application, Scope, Configuration

Introduction

The proposed paper discusses various approaches to inclusive education. We focus on pedagogy design while delivering instruction in diverse classrooms. As idealization is initiated through inclusive education, therefore, the subject of pedagogy has to be applied well in formulating ideals. The gathering of students of different backgrounds in the classroom may lead to various problems in managing the learning process among them. So, we can easily move towards the solution from that problem. We have to pay attention to that too. Besides, when the teaching method is formulated in the

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NEP-2020 AND HIGHER EDUCATION:

ISSUES AND CHALLENGES

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NEP-2020 AND HIGHER EDUCATION: ISSUES AND CHALLENGES

by: Dr. Sunil Kumar Baskey, Mr. Ananta Roy, Mr. Debanand Ray

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CHAPTER - 19

PRACTICE OF SANSKRIT LANGUAGE IN THE CLASSROOM PERSPECTIVE OF NEP 2020

Dr. Somnath Das [1], Dr. Moumita Bhattacharya [2]

ABSTRACT:
Language is the best medium of human behaviour exchange. Linguistic skills are considered as the main means of communication. In the classroom as well, when the teacher takes the language, he gives priority to the exchange of ideas and the expression of ideas. Since the subject of education is subject to change, we see some differences in language skills or methods of achievement, i.e., systematic differences among students. Sanskrit language is one of the oldest languages. If we review our new education policy, we can learn something about the necessity of Sanskrit language like other languages. Also, practical ways of classroom to acquire Sanskrit language are also properly recorded in this research paper. As a result, there was no hindrance in serving the matter.

Keywords: *Contextual space, service, method formulation, continuity*

INTRODUCTION:

In this research paper the issue of Sanskrit language classroom practice in the new pedagogy is very well served. When any linguistic analysis is done, the first emphasis is placed on communication. In the present education system, therefore, multiple lectures are presented in the classroom in a direct manner. In order to carry out any linguistic practice, the classroom first needs to have a suitable atmosphere. As a result of the grouping of students of different quality in diverse classrooms, psycho-strategic contrasts can be observed among them. At work, that subject and how it can be applied in the

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Chapter 5

Functionalization of carbon-based nanomaterials with ionic liquids

Sahita Karmakar[a], Parveen Begum[a], Kaizar Hossain[a], Akil Ahmad[b], K Suresh Kumar[c], and Rameeja Shaik[d]

[a]*Department of Environmental Science, Asutosh College, University of Calcutta, Kolkata, West Bengal, India,* [b]*Department of Chemistry, College of Sciences and Humanities, Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia,* [c]*Departments of Environmental Science, GITAM, Visakhapatnam, Andhra Pradesh, India,* [d]*Departments of Environmental Science, Visakhapatnam, Andhra Pradesh, India*

1 Introduction

After hydrogen and oxygen, carbon progressively becomes the third-largest element in our home planet. In the periodic table, Carbon is without a doubt the utmost fascinating element due to its capacity to bond to both itself and practically any other element. After hydrogen and oxygen, carbon progressively becomes the third-largest element in our home planet [1]. Numerous carbon-based types exist. It has been shown that the reactivity of carbon composites is boosted by the complicated chemistry of carbon and existence of functional-groups such as oxygen & hetero-atomic functional-groups (S, B, P, and N) on the surface of carbon. The production of carbon compounds relies on pyrolysis, which is coupled by the stimulation of unprocessed biomass or polymers [2].

The carbonization of polymeric heteroatom-containing polymers or the high-temperature treatment of unprocessed carbon sources with reactive gases like hydrogen sulfide and ammonia are two common methods for introducing heteroatoms into carbons. The limitation of functional groups as a result of severely distorted processing conditions, however, is a challenge to be solved [3]. However, small molecules also produce little carbon and are frequently quite volatile. The post-treatment phase is very challenging to manage. There is currently a high demand for the creation of a manageable and straightforward technique for the synthesis of carbons with the required features, such as functionality, heteroatom doping and porosity [4]. Presently, IL-based methods for the manufacture of carbon composite materials have received a lot of attention

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Chapter 8

Pharmaceutical application of ionic liquids and evaluating their toxicity and biological activity

Parveen Begum[a], Diya Ghosh[a], Akil Ahmad[b], Y.A. Maruthi[c], and Kaizar Hossain[a]

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1 Introduction

Ionic liquids function as polar solvents and are effective for a variety of substances. A minimal vapor pressure, good thermal stability, and relatively high viscosity are some of their physical characteristics to note that set them apart from traditional organic solvents. Organic solvents are frequently used in the industrial synthesis of pharmaceutical substances, which can result in organic adulteration of the ultimate product as well as often contains residual contaminants. Ionic liquids are being investigated as a variety of reaction media with unique properties for several organic transformations as well as the manufacturing of pharmaceuticals [1,2].

Toxicology is the science of chemical substances and their combinations that can damage the organs of the living being. The dose at which it starts to harm an organism, a substance becomes toxic. Acute toxicity refers to harmful effects on an organism after a single or brief exposure. Many frequently used ionic liquids (ILs) have been shown to have a certain level of toxicity. There have been toxicological studies conducted on ILs throughout the past few decades. The different systems, including the environmental and biological aspects, are affected by the ILs toxicities. Ionic liquid had a direct effect on cell membrane disruption. Long alkyl chains in the cationic portion of ILs, higher

Ionic Liquids and Their Application in Green Chemistry. https://doi.org/10.1016/B978-0-323-95931-5.00009-9

Development and Performance of Wood Waste Briquettes in Pyrolysis Reactor

Mohammed Nasir, Pawan Kumar Poonia, Kaizar Hossain, and Mohammad Asim

Abstract In the present scenario, fossil fuel-based energy comprising oil, coal and natural gas is the main source of global energy. It is leading to many environmental issues like global warming, acid rain and urban smog. Moreover, this fossil fuel is non-renewable and anticipated to be depleting in the next 4–5 decades. Wood-based energy generation is one of the oldest energy sources, and consist of many advantageous characteristics. In this review, the briquette manufacturing technology from waste wood through different processes is discussed. Huge amount of wood-based biomass produced every year throughout the world, in the form of used furniture, temporary houses and industrial waste is a liability to municipal departments of the cities and generally used as a landfill. Such wood waste can be potentially utilized for briquette manufacturing. The wood waste type, amount and availability are varying in different countries depending on domestic and industrial practices. Since the briquette is a product of wood, the product quality is dependent on the raw material characteristics like density, moisture and calorific properties of wood. Other factors like impurities in waste wood and the addition of binding material in briquette manufacturing determine the economics and market value of the briquette. The quality of the briquette is assessed on the basis of product density and calorific value. Different manufacturing technology is being practised based on the size, the moisture content in raw material and the adhesive used. The briquettes are generally burnet in a pyrolysis reactor that requires lower heating temperature, and equipment

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CHAPTER 6

Study of Geomorphological Characteristics Through Geomatics: A Case Study of Tungabhadra Upper Basin, Karnataka, India

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Abstract:

This book chapter deals with the geomorphological characteristics of Tungabhadra Upper drainage basin by using the environment of Geomatics. Geology, geomorphology, lithology, stratigraphic map of the studied basin has been prepared by using Bhukosh shape file data of GSI. Climate maps (temperature, rainfall, relative humidity) has been made by using CRU data. The morphometric analysis (Relief, slope, aspect) is focused on basin scale. SRTM DEM has been used to do the morphometric analysis as well as to get. the geometry of the long section and the cross-sections across and along the river respectively. The drawn cross-sections represent the geometry of river valley of Tungabhadra Upper basin. Valley floor width to valley height ratio (Vf) has been measured for the representative cross-sections, which has been treated as one of the effective geomorphic indices to determine the structural control over the sectional geometry of river. The lower magnitude of Vf of the Upper catchment cross-sections represents the tectonically active narrow 'V' shaped valley, whereas the higher magnitude of Vf of the lower catchment refers the presence of flat wider valley of Tungabhadra Upper basin.

Key words: Basin morphometry, cross-sections, Valley floor width to valley height ratio, sectional geometry of channel, structural control

Introduction:

Tungabhadra River is one of the most important tributaries of Krishna River (India's second largest basin). The studied Tungabhadra upper sub-basin is a part of Krishna basin which is located in the south-western part of Krishna Basin. The latitudinal and longitudinal extension of the study area is between 13°05'N to

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CHAPTER 6

A Review on Fermentation based Functional Food with Antidiabetic Properties

Dr. Mithu Biswas*

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Asutosh College, Kolkata

Abstract:

Diabetes is a chronic human ailment characterized by high glucose level in blood, termed as hyperglycemia. The global report on diabetes is quite alarming and is increasing rapidly in urban population of developing countries. Our food preferences have changed with time as well our lifestyle. It is a lifestyle disease and can affect people of any age group. Fermented food which harbours gut friendly microbiota can be a part of our daily diet to ensure a healthy food habit. Fermented foods are a kind of functional food and many of them are reported to have antidiabetic properties. Consumption of such food would give an alternative remedy of hyperglycemia. Alternative prophylactic approach is far better than dependency on any drugs to combat with or prevent diabetes and its associated complications. The present article is a review on the latest findings on the antidiabetic properties of several fermented foods. Scientists have reported considerable anti-hyperglycemic activity of such fermented foods in various in vivo mice models which would further help in popularizing and marketing of fermentation based functional food as an alternative strategy of combating diabetes in future.

Keywords: hyperglycemia; fermented food; microbiota; diabetes; fermentation

Introduction:

Father of modern medicine, Hippocrates, once said "Let food be the medicine, the medicine shall be the food". This has diverted the attention of researchers to focus more on food and nutrition and health benefits of certain foods which act as functional food (El Sohaimy, 2012).The term "functional food" came into existence during 1980's in Japan for improving and increasing the life span of old people in order to put away the healthcare costs. Functional foods are regular foods which are part of uncommon diet and not in the form of dose (Hasler, 1998) and which provides physiological and health benefits apart from basic nutrition (Peter, 2002) and do not prevent and cure the disease. Fermented foods are generally considered as functional foods. Fermented food production is an age old

*Corresponding Author

chapter 2

Role of Raja Rammohan Roy in Modernization: Perspectives from Bengal Renaissance

Satarupa Pal

Raja Rammohan Roy is the one of the important persons of Bengal Renaissance. Bengal renaissance refers largely to the social, cultural, psychological, and intellectual changes in Bengal during the 19th Century, as a result of interaction between certain sympathetic British personnel's and missionaries' on the one hand and the Hindu intelligentsia on the other. The focusing for the Bengal renaissance was the colonial metropolis Calcutta. It is said that the period of Bengal renaissance from 18th century early to 20th century. Social reformer Raja Rammohan Roy considered the 'Father of the Bengal Renaissance', reflecting various types of reforms under his leadership. It is noteworthy that Bengal renaissance exhibited radical transformation of Indian society, and its ideas have been attributed to the rise of Indian anti-colonialist and nationalist thought and activity during the period. The Bengal renaissance was predominantly led by Bengali Hindus, well-known figures include Raja Rammohan Roy, Rabindranath Tagore, Satyendra Nath Bose. The Bengal Renaissance was a movement characterized by a socio-political awakening in the arts, literature, music, philosophy, region, science and other field of intellectual inquiry (Ghosh, 2002:4330). Within this context, Raja Rammohan Roy was a tireless social reformer who inaugurated the age enlightenment and modernization in India. Viewing western education, Bengali intellectuals are supposed to have effected a western style 'Renaissance' in contemporary thought and liberal arts. This type of studies have focused exclusively on a dominant print culture shaped by educated elite, and tried to make causal link between western education, control over print technology, and dissemination of occidental knowledge. One of the most influential social and religious reformers of the 19th Century. Raja Rammohan Roy, born on 22nd May 1772 in Radhanagar in Hooghly district, would have turned 250 years of 22nd May, 2022. As India grapples increasingly with changing social and

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Mahabharata in South East Asia

Dr. Arnab Patra

Summary

Observing the patterns of world geography, it is seen that Asia is the largest continent among all the continents. In this entire continent, the diversity of literature and life-class guide is also observed. India is a country in Asian continent, the civilization, culture, religion, philosophy of this India is specially attracted to different countries. That is, the culture of India is so beautiful that the culture of different countries is trying to imitate. A similar clue can be found from the context of the Mahabharata. That is, culture and religious thought in India's Civilization Mahabharata section, which has been reviewed by various countries. As a result, Mahabharata grew.

As an example of a part of the biography described in the Mahabharata, it is proved that the development of the country is associated with literature and culture. Real education must be imparted to the masses. Therefore, the Mahabharata has had a great influence in India's Southeast Asia-Thailand, Canada, Cambodia, Indonesia have been able to promote the Mahabharata, and as a result, the literary culture has been able to enhance the culture of India, as evidenced by the Mahabharata.

Main Subjects : The main practice of Mahabharata is the events of the cities of the crocodiles and the pandabad of the crowd and the wreaths of the wicket. However, out of this narrative, most of the different parts of philosophy and devotion have been added to this epic. For example, religion, money, cum and mode - this discussion has been added to this chart. Other important compositions and episodes in the Mahabharata are the Bhabadditita, a maximum number of Ramayan, etc. However, they are considered to be the own

7 Chapter DISABILITY AND HIGHER EDUCATION

Dr Arnab Patra [10]

ISBN 978-91-989240-6-0

Abstract:

Education is never confined to certain areas or fields. Although the education system includes various fields, each subject has a specific structure and method of education. This specific structure or method makes that education different from other education. Inclusive education is just such an education - an education in which we see students of different natures traveling together. This education has its own specialism in its specific method and structure. Therefore, it goes without saying that the specialty of inclusive education is of an equally advanced nature as other educational professions and methods.

Keywords: Apply, Nature Structure, Assessment.

Introduction

The proposed research paper has been focused on inclusive education and higher education aspects. Speaking of special education talks, he has to focus on its vice system. In order to focus on various fields, we have to monitor disability. This disability is in the case of natural or ethnicity. But for this disability, the students who have different obstacles will be created, so they can also create equal opportunities in higher education, for this include education. As a result of this education, there was no difficulty in higher education and students. The use of teaching but not limited to nature, but its application between its application and its area increases and the evaluation of the teaching evaluation is a precious area of education system. This paper has also focused on those things

As inclusive education is a combination of general and special education, the practical aspect of this education is slightly different

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CONTENT

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An evening in the Miramare Castle

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It was a lazy November afternoon in Trieste. The winter was just starting to strengthen its grip in the northeastern parts of Italy in the year 2011. The Adriatic Sea in front of my balcony was starting to get its first ice cover of the season. A handful of fishing boats were tied to the shore with their masters nowhere to be found. Far away on the horizon, the blue sky was passionately kissing the sea. Although the weather was chilly, yet the mesmerizing beauty of the place could move the heart and soul of the most pessimistic individual. There is no denying the fact that sitting on the balcony post-lunch a bunch of poetic thoughts dawned upon me. But I restrained myself and decided to visit the nearby Miramare Castle that evening.

Fig 1: The hills meeting the Adriatic Sea in Trieste

Carbon Dots: A Comprehensive Review of Synthesis, Properties, and Emerging Applications

Dr. Monoj Kumar Barman
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Abstract:

Carbon dots (C-dots), nanomaterials exhibiting nanoscale structures and remarkable properties, have garnered attention for their versatile applications. This brief review highlights their small size, diverse characteristics, and contributions to fields such as nanotechnology, materials science, medicine, and environmental science. Key features, including tunable photoluminescence, biocompatibility, chemical versatility, low cost, and stability, underscore the potential of carbon dots for innovation and progress. This exploration sets the stage for further advancements in utilizing carbon dots across various scientific and technological realms.

I. Introduction:

Carbon dots, often abbreviated as C-dots, are a class of nanomaterials composed of carbon atoms arranged in a nanoscale structure.(Barman & Patra, 2018; Han et al., 2018a; F. Yuan et al., 2016a) They are characterized by their small size, characteristically ranging from a few nanometers to a few tens of nanometers, and their remarkable optical, electronic, and chemical properties. Carbon dots (CD) have gained significant attention in recent years owing to their diverse applications in various fields, ranging from nanotechnology, materials science, and medicine, to environmental science.(Feng et al., 2020; Hola et al., 2014; Saini et al., 2022; F. Yuan et al., 2016b)

For the last 100 years, the carbon nanomaterials family become one of the most versatile areas of research for their widespread application in the field of renewable energy and environmental science. Being a newcomer to the prestigious family of carbon nanomaterials, carbon nanoparticles constitute a fascinating class of discrete quasi-spherical nanoparticles with intense photoluminescence properties.(Z. Peng et al., 2017a; Yao et al., 2022) Along with carrying the family DNA (carbon nanomaterials), the fluorescence behavior of carbon nanoparticles makes them promising new-generation materials for photonics and bio-photonics applications. In 2004, Scrivens and colleagues made the initial discovery of fluorescence

characteristics in carbon nanoparticles while carrying out the electrophoretic purification of single-walled carbon nanotubes through the arc-discharge method. This fortuitous discovery of luminescent carbon nanoparticles made scientists think about these abundant and non-hazard fluorescent particles. Sun and colleagues were the first to coin the term "carbon dots," a broad classification encompassing all carbon-based fluorescent nanoparticles, including carbon nanodots and graphene quantum dots.(Biswas et al., 2021a; Boakye-Yiadom et al., 2019a; H. Li et al., 2020a)

Key characteristics and properties of carbon dots include:

Photoluminescence: One of the most notable features of carbon dots is their strong and tunable photoluminescence. They can emit light in a wide range of colors, including blue, green, and red, depending on their size, surface functionalization, and synthesis methods. This characteristic makes them beneficial in applications such as fluorescent labeling, bioimaging, and optoelectronic devices.

Biocompatibility: Carbon dots are usually measured to be biocompatible and non-toxic, which makes them appropriate for various biomedical applications. They can be used as contrast agents for imaging, drug delivery carriers, and sensors for detecting biomolecules, among other things.

Chemical Versatility: Carbon dots can be effortlessly functionalized with various organic groups or chemical moieties, allowing for tailoring their surface properties and improving their performance in specific applications. This versatility enables their use in a wide range of fields, from catalysis to sensing.

Low Cost: Carbon dots can be synthesized from readily available and inexpensive precursors, such as carbon-rich organic compounds or even waste materials like coffee grounds or fruit peels. This cost-effectiveness makes them appealing for large-scale production.

Stability: Carbon dots exhibit good stability, even under several environmental conditions, which enhances their suitability for long-term applications.

As we embark on this journey through the enigmatic realm of carbon dots, we will unveil their wondrous properties and explore the myriad ways in which they illuminate the path to innovation and progress.

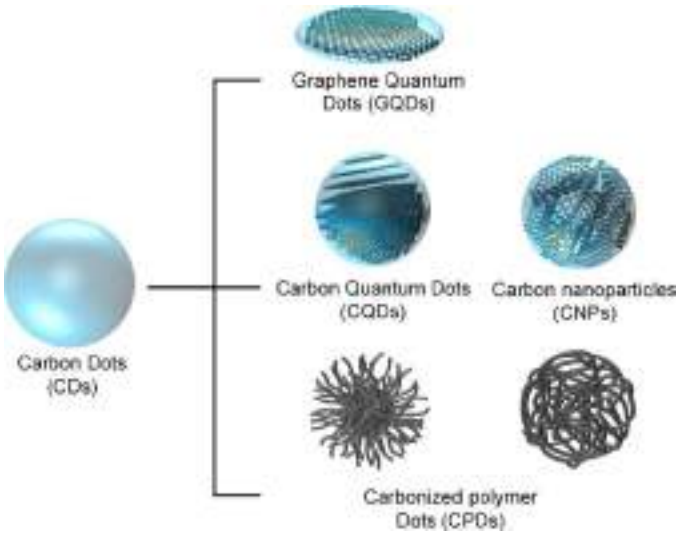

Figure 1: Carbon based Quantum dots (Carbon dots) and its classification (Ozyurt et al., 2023)

II. Synthesis

Scientists have employed various techniques to produce carbon dots. Depending on the synthesis conditions and methods, the properties of carbon dots change significantly. Here a brief understanding of all the synthetic methods is given.(Barman & Patra, 2018; J. Liu et al., 2020; Ozyurt et al., 2023)

1. Top-Down Methods:

a) Laser Ablation: This method involves using a high-energy laser to ablate a solid carbon source, typically graphite, submerged in a liquid medium. The laser's energy causes the carbon material to vaporize and condense, forming nanoscale carbon dots suspended in the liquid.

b) Electrochemical Exfoliation: In electrochemical exfoliation, a voltage is applied across an electrode immersed in a solution containing a carbon-based material. The electrical potential forces the carbon layers to exfoliate, separating them into individual CD structures in the solution.

2. Bottom-Up Methods:

a) Hydrothermal/Solvothermal Synthesis: This widely adopted method relies on heating a precursor solution, which includes a carbon source like glucose, citric acid, or other carbon-rich compounds, in a high-pressure vessel. At elevated temperatures and pressures, carbon atoms nucleate and grow into CDs within the solution.

b) Microwave-Assisted Synthesis: Microwaves are employed to rapidly heat the precursor solution. The focused microwave energy accelerates the reaction kinetics, leading to faster and more controlled CD formation.

c) Ultrasonic Irradiation: Ultrasonic waves are used to induce cavitation in a solution containing a carbon source. The resulting microbubbles collapse violently, causing the carbon source to break down into tiny fragments that subsequently nucleate into CDs.

3. Chemical Oxidation:

a) Acid Treatment: In this method, a carbon-rich precursor material is treated with strong acids, like sulfuric acid or nitric acid. The acidic environment causes oxidation and fragmentation of the precursor, leading to the formation of CDs.

b) Oxidation using Oxidizing Agents: Chemical agents like potassium permanganate ($KMnO_4$) or hydrogen peroxide (H_2O_2) can be used to oxidize carbon sources. This oxidative environment results in the construction of CDs through controlled chemical reactions.

4. Pyrolysis:

Thermal Decomposition: Carbon-rich precursors are subjected to high temperatures in an inert atmosphere. This process leads to the thermal decomposition of the precursor material, yielding CDs as the final product.

5. Photochemical Synthesis:

Photodissociation: In this technique, a carbon-rich precursor is exposed to light of a specific wavelength. The energy from the light is harnessed to break chemical bonds within the precursor molecule, resulting in the generation of CDs.

6. Template-Assisted Synthesis:

a) Hard Templating: CDs are formed within a rigid template structure, such as zeolites or silica nanoparticles. After the carbonization process, the CDs are extracted from the template, taking on its size and shape.

b) Soft Templating: Surfactants or polymers are utilized as templates to guide the nucleation and growth of CDs. The templates help control the size and morphology of the resulting CDs.

7. Green Synthesis:

Biosynthesis: Green synthesis methods involve the usage of biological entities like microorganisms, plants, or enzymes to produce CDs. These eco-friendly methods often result in biocompatible CDs and are considered environmentally friendly.

8. Plasma Synthesis:

Plasma Discharge: In plasma synthesis, a plasma discharge is employed to trigger chemical reactions in a carbon-rich precursor material. The high energy and temperature conditions within the plasma facilitate the formation of CDs.

9. Micelle-Mediated Synthesis:

CDs are created within micellar structures, which act as confined reaction chambers. These templates guide the nucleation and growth of the carbon dots, controlling their size and properties.

Each of these synthesis techniques offers distinct advantages, leading to variations in the size, surface functionalization, and optical properties of the resulting carbon dots. The choice of method depends on the specific requirements of the application and the desired CD characteristics.

III. Characterization

The composition and structure of C-dots can vary significantly depending on the synthesis method and the starting materials. Here are some general overviews on composition and structure of carbon dots.(Dager et al., 2019; J. Liu et al., 2020; Nie et al., 2014; Ozyurt et al., 2023)

Composition:

a) Carbon Core: At the heart of all C-dots is a carbon core. This core can be either amorphous or crystalline, and its properties can vary. The core is generally composed of sp^2 hybridized

graphitic structure. It is responsible for the unique optical and electronic properties of C-dots.(J. Liu et al., 2020; Ozyurt et al., 2023)

b) Functional Groups: Carbon dots (C-dots) are adorned with a variety of surface functional groups. These functional groups can include hydroxyl (-OH), carboxyl (-COOH), amino ($-NH_2$), epoxy (-O-), and other organic moieties. These functional groups are frequently responsible for the chemical reactivity and biocompatibility of C-dots. Owing to these functional groups, Carbon dots are highly soluble in water and remain highly stable for a long time.(Barman & Patra, 2018; Han et al., 2018a)

c) Heteroatoms doping: Sometimes C-dots are incorporated with heteroatoms like nitrogen (N), sulfur (S), or phosphorus (P) into their structure (doping). These heteroatoms can modify the electronic structure of the C-dots, resulting in different optical and chemical properties. Nitrogen-doped C-dots, for example, have been extensively studied for their enhanced photoluminescence and other unique properties.(Barman et al., 2014; Barman & Patra, 2018)

Structure:

a) Size: C-dots are generally very small, with sizes ranging from a few to several nanometers (figure 1). The size of the C-dots can influence their optical properties, with smaller C-dots often exhibiting higher energy emissions.

b) Shape: C-dots can have different shapes, including spherical, elliptical, and irregular. Their shape can impact their surface area and reactivity.

c) Core-Shell Structure: Some C-dots exhibit a core-shell structure, where the carbon core is surrounded by a shell of functional groups. Both core and shell structure can affect their stability, photoluminescence, and interactions with other materials.

d) Crystal Structure: In some cases, C-dots may exhibit crystallinity, with ordered atomic arrangements. However, many C-dots are amorphous, lacking long-range order.

e) Quantum Confinement: C-dots exhibit quantum confinement effects due to their small size. These effects can result in the size-dependent optical properties of C-dots, such as tunable fluorescence emissions.

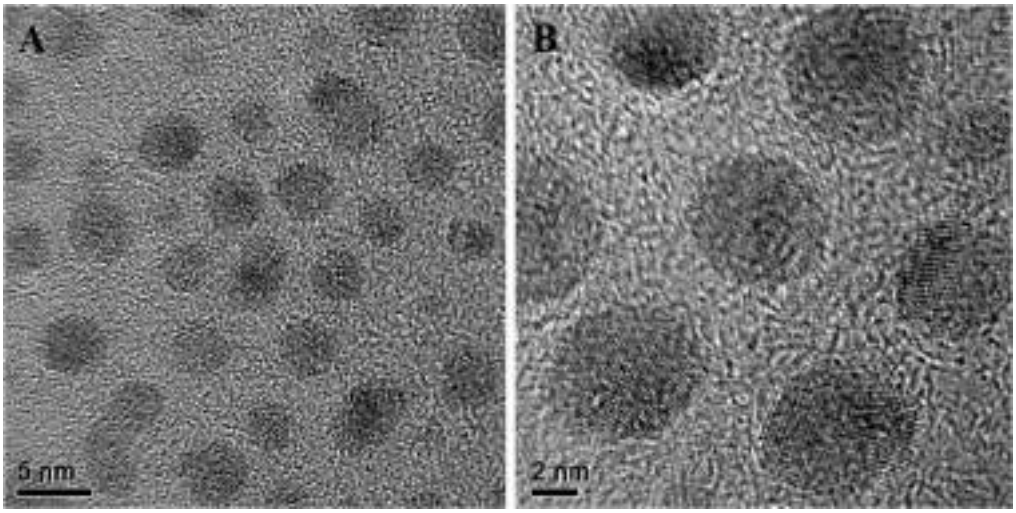

Figure 2: TEM image of Carbon dots. (Dager et al., 2019)

IV. Optical Properties

a) Absorption

Carbon dots show different absorption behavior depending on their precursors and synthetic methods. However, a common pattern is observed where strong absorption band ranging between 200-300 nm is found corresponds to π–π* transition of graphitic core and between 300-400 nm corresponds to n→π∗ transitions of C=O, respectively. In addition to these two absorption bands, other bands and long tail is observed in the visible region (>400 nm) which are ascribed to the existence of several surface states and defects.(Barman et al., 2013, 2014, 2016)

b) Photoluminescence

Carbon dots (CDs) possess versatile photoluminescence (PL) characteristics that make them highly suitable for a range of applications. These characteristics, such as various color emissions, are contingent on factors like material composition, morphology, and synthesis methods. However, their utilization has been hindered by difficulties in controlling synthesis methods and comprehending the PL mechanisms. Notably, PL in CDs, particularly in graphene quantum dots (GQDs) and carbon quantum dots (CQDs), is primarily influenced by the quantum confinement effect (QCE) and surface states, including functionalities, defects, heteroatom doping, and edge configurations. Nonetheless, the exact PL mechanism remains elusive. Typically, CDs exhibit

blue and green emissions, and their emission properties are excitation-dependent due to variations in size and composition.(Barman et al., 2013, 2016, 2017)

From both fundamental and practical standpoints, the photoluminescence (PL) property of carbon dots (CDs) stands out as highly appealing. Compared to other fluorescent materials such as traditional cadmium/lead-based quantum dots (QDs), rare-earth nanomaterials, and organic dyes, CDs offer several advantages, including enhanced light stability, higher quantum yield (QY), lower toxicity, abundant low-cost sources, and excellent biocompatibility. Consequently, CDs find a multitude of valuable applications in diverse fields. The brightness of PL is quantitatively represented by the QY value, which is significantly influenced by the carbon sources, synthetic methods, and post-passivation techniques. In a broad context, CDs produced via "top-down" approaches generally exhibit relatively lower QY values compared to those synthesized using "bottom-up" methods.
Understanding the intricate optical characteristics of carbon dots involves various explanations that can be largely characterized into three main groups:

Graphitic Core-Driven Optical Properties: In this category, the optical behavior of carbon dots is primarily influenced by the graphitic core. The leading role in photoluminescence is played by the quantum confinement effect, where the size of the core restricts the motion of electrons and, in turn, affects the emission of light.(Kwon et al., 2014; J. Peng et al., 2012; Sk et al., 2014; Ye et al., 2015; Yeh et al., 2016)

Surface-Mediated Optical Properties: This group of explanations focuses on the luminescence of carbon dots resulting from surface defects and the synergistic interplay of two factors: quantum confinement and surface effects. Surface defect states, in conjunction with quantum confinement, significantly impact the observed optical properties.(Bao et al., 2011; Ding et al., 2016; Gao et al., 2017; Kwon et al., 2015; X. Li et al., 2014; Y.-P. Sun et al., 2006)

Molecular Fluorescence: Another aspect involves the emergence of molecular fluorescence within carbon dots. This fluorescence is attributed to the existence of various π-conjugated

islands inside the carbon dots, contributing to their unique optical characteristics.(Ehrat et al., 2017; Fu et al., 2015; Schneider et al., 2017; Song et al., 2015)

In addition to these three approaches, there is a separate area of concern related to doping, which also plays a vital role in influencing the photoluminescent behavior of carbon dots.(Barman et al., 2014; Choi et al., 2016; Dong et al., 2013; Holá et al., 2017)

Shi-Woo Rhee and their team have devised an innovative method to precisely control the synthesis of carbon dots with customizable light emissions spanning the entire visible spectrum.(Kwon et al., 2014) Through a straightforward solvothermal process, they've successfully created carbon dots ranging in size from 2 to 10 nanometers. This size variation is achieved by carefully adjusting the concentration of amines in an organic medium, using graphite powder as the source material (see Figure 3). Notably, as the size of these particles gradually increases, the band gap decreases, leading to the fascinating ability to fine-tune photoluminescence, producing colors that span from vibrant blue to rich brown.

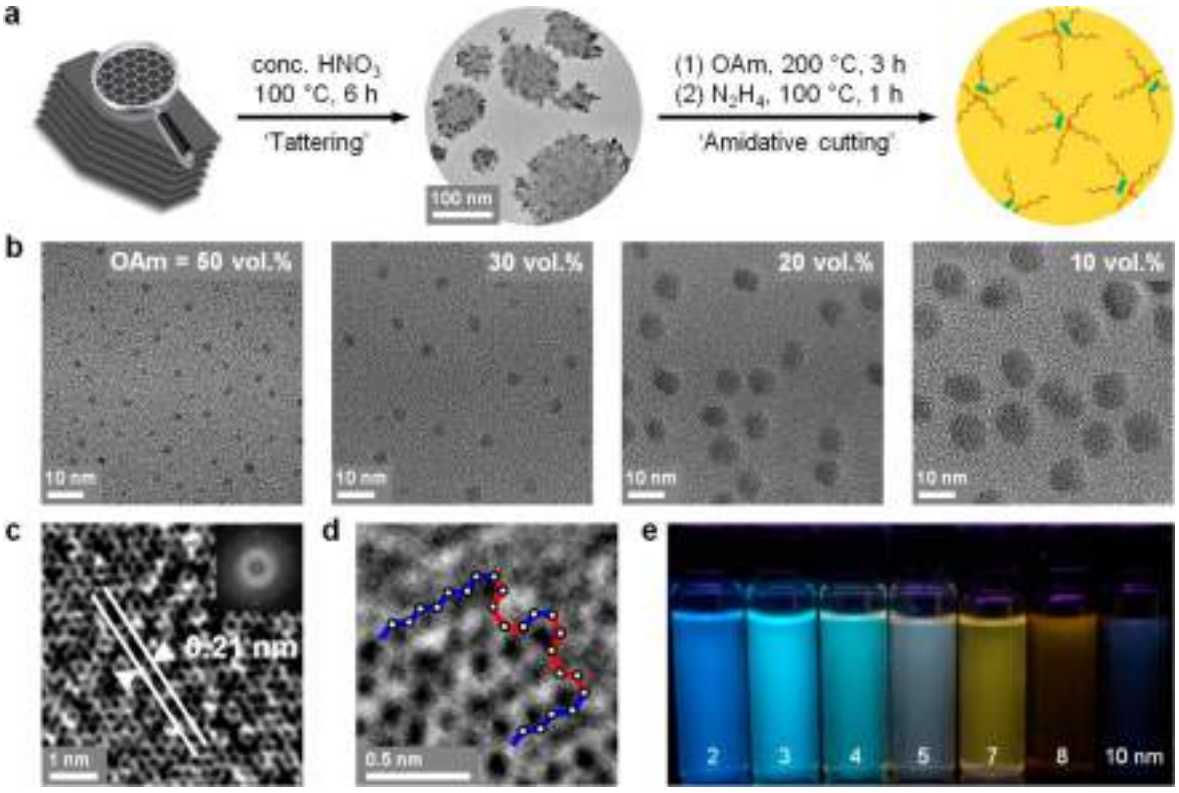

Figure 3: Size controlled synthesis of carbon dots and their tunable optical properties.(Kwon et al., 2014)

Meanwhile, Xiong and their dedicated research team have exhibited an impressive level of precision in controlling the synthesis of carbon dots, resulting in the ability to fine-tune emissions across the entire visible spectrum. Their work has yielded remarkable quantum yields of up to 35% in aqueous environments, as exemplified in Figure 4 (Ding et al., 2016) Notably, carbon dots derived from the combination of urea and p-phenylenediamine consistently emit light, regardless of the wavelength used for excitation.

Their comprehensive investigations have uncovered a pivotal factor in achieving this tunable emission: the degree of oxidation in the surface states of the carbon dots. As the level of oxidation increases, it effectively reduces the band gap of the carbon dots, subsequently causing a shift in the emission peak towards the red region of the spectrum.

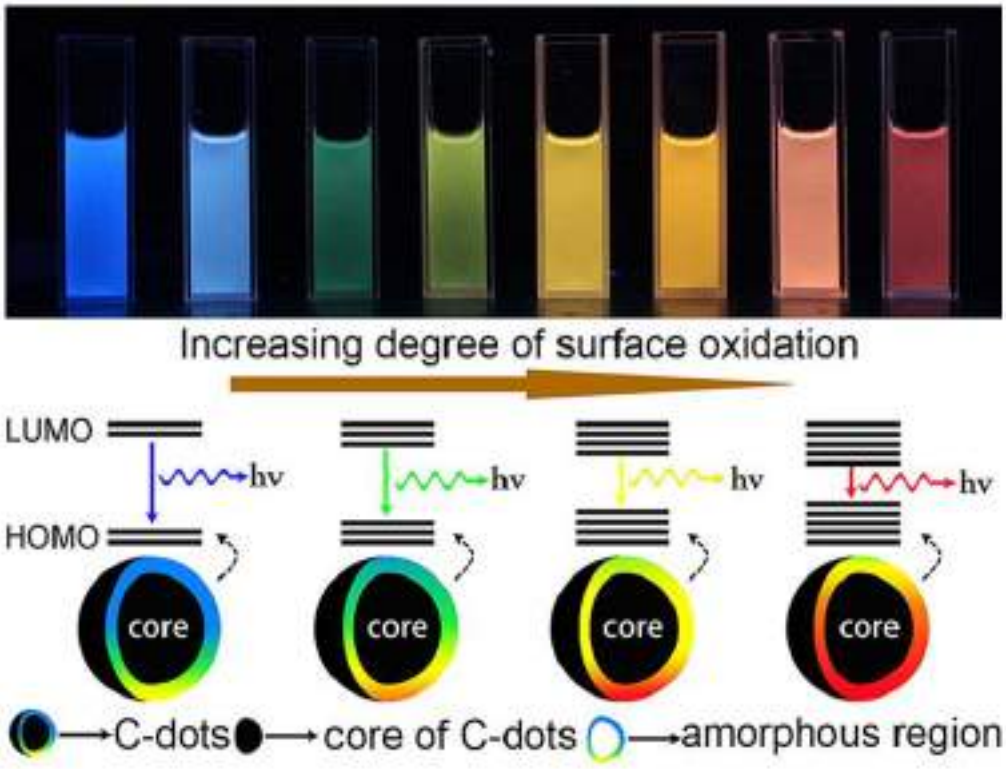

Figure 4: Surface mediated tunable optical properties of Carbon dots.(Ding et al., 2016)

Doping can also modify the photoluminescence properties of C-dots. A study by Zboril and their team elucidates that the adjustment of graphitic-N content in carbon dots offers precise control over photoluminescence, ranging from blue to red, as depicted in figure 5.(Holá et al., 2017) The

presence of graphitic-N introduces an intermediate energy state inbetween the band gap of undoped carbon dots, lying between the Highest Occupied Molecular Orbital (HOMO) and the Lowest Unoccupied Molecular Orbital (LUMO). This phenomenon leads to the reduction of the band gap and consequent red-shifted photoluminescence.

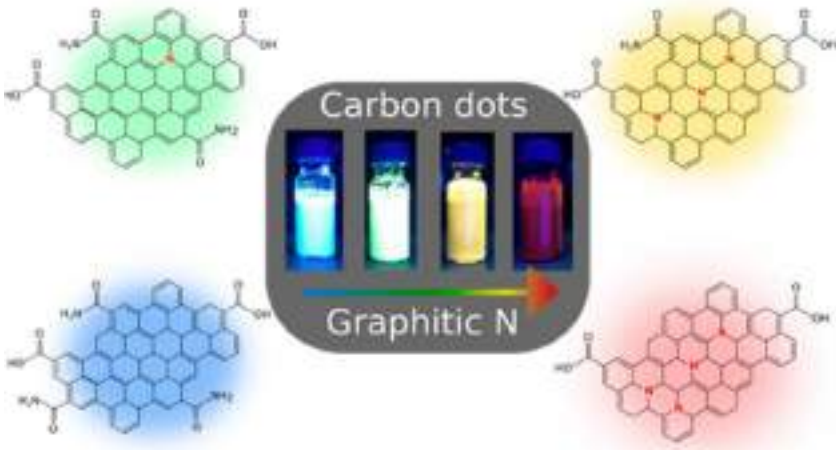

Figure 5: Doping induce tunable optical properties of carbon dots.(Holá et al., 2017)

V. Applications

Bioimaging:

a) Cell Labeling: Carbon dots are used to label and track cells in biological studies. They are advantageous because of their minimal cytotoxicity and strong fluorescence. The particles can be functionalized for specific cellular targeting, enabling the visualization of cells in real time.(Boakye-Yiadom et al., 2019b; B. Wang et al., 2022)

b) In Vivo Imaging: Due to their biocompatibility, carbon dots have the potential for in vivo imaging. They are used for tracking and monitoring disease progression or the distribution of drug carriers within living organisms.(H. Li et al., 2020b; Sharma et al., 2017)

For example, the Lin group successfully produced highly efficient red-emitting carbon dots using citric acid and formamide. These dots exhibit low cytotoxicity and possess a high quantum yield. They emit pure red light at around 640 nm, making them ideal for bioimaging. Unlike carbon dots with blue and green emissions that can harm biological structures due to UV absorption, these red-emitting carbon dots offer great promise as bioactive materials. They exhibit a strong affinity for RNAs in the nucleolus, making them valuable for nucleolus imaging and compatible with other subcellular dyes. These carbon dots can also be conjugated with fluorescein

isothiocyanate (FITC) for living cell drug delivery. Furthermore, their outstanding photothermal conversion efficiency positions them as strong candidates for in vitro photothermal cancer therapy.(Figure 6).(S. Sun et al., 2016)

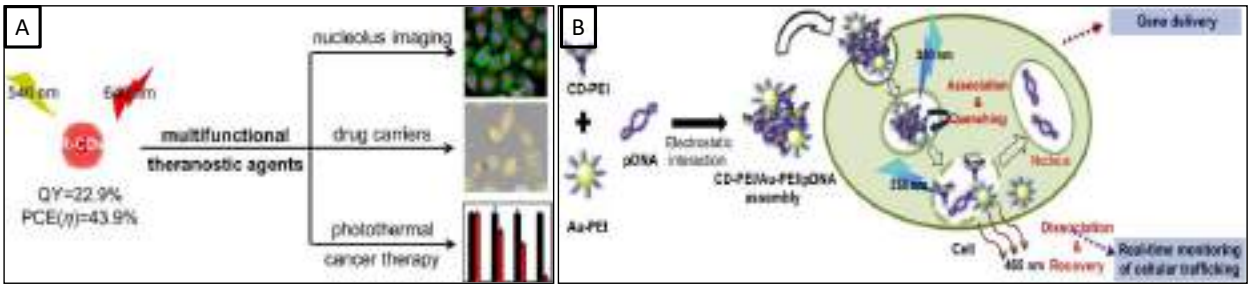

Figure 6: A) Bioimaging application(S. Sun et al., 2016) and B) Gene delivery by C-dot composite. (Kim et al., 2013)

Drug Delivery:

a) Targeted Drug Delivery: Carbon dots can be modified to carry drugs to specific tissues or cells. Surface functionalization allows for the attachment of targeting ligands, enhancing drug delivery efficiency while reducing off-target effects.(Z. Peng et al., 2017b; Z.-X. Wang et al., 2022)

b) Controlled Release: Carbon dots can be engineered to respond to external stimuli such as light or changes in pH, temperature, or redox potential. This control over drug release is especially beneficial for precision medicine.(Biswas et al., 2021b; Ding et al., 2015)

Kim and colleagues devised a straightforward method for delivering DNA to cells using carbon dots and gold nanoparticles (Fig. 6). They achieved this by forming a complex between negatively charged plasmid DNA (pDNA) and positively charged PEI-modified gold nanoparticles, as well as carbon dots, through electrostatic interactions. The carbon dots' emission in the complex was initially quenched by the gold nanoparticles. However, once inside the cells and with the release of pDNA, the distance between the gold nanoparticles and carbon dots increased, ultimately restoring the luminescence of the carbon dots. This charge-based interaction involving CD-PEI/Au-PEI/pDNA complexes enables label-free pDNA delivery to the cell nuclei, leading to significantly improved transfection efficiency.(Kim et al., 2013)

Sensors:

a) Biological Sensors: Carbon dots are used as sensors for detecting biomolecules like glucose, DNA, and proteins. Their high surface area and ability to quench or enhance fluorescence in the

presence of certain molecules make them excellent candidates for biological assays.(W. Liu et al., 2016; Shen & Xia, 2014)

b) Environmental Sensors: In environmental monitoring, carbon dots are employed to detect and quantify pollutants like heavy metals and organic compounds. Their selectivity and sensitivity can help ensure the safety of water and air quality.(Umrao et al., 2015)

c) Gas Sensors: Carbon dots can detect gases, such as nitrogen dioxide, ammonia, or methane, making them valuable for environmental monitoring and safety applications.(Nie et al., 2014)

d) Toxin Detection: C-dots are used for the quick detection of toxins and pollutants in environmental samples, food, or biological matrices.

Yu et al. created a carbon dots-dye hybrid system for ratiometric H_2S detection in water, serum, and live cells. They linked naphthalimide-azide to carbon dots, resulting in intense blue emission at 425 nm under 340 nm excitation. Upon adding H_2S, a reduction process converted naphthalimide-azide to naphthalimide-amine, emitting at 526 nm, making it a good energy acceptor. The overlap between carbon dots' emission and naphthalimide-amine's absorbance enabled energy transfer via FRET at 340 nm excitation. Increasing H_2S concentration enhanced 526 nm emission. This system achieved an impressive 10 nM detection limit, the lowest for H_2S in aqueous solutions, serving as a ratiometric sensor in biological fluids and live cells.(C. Yu et al., 2013)

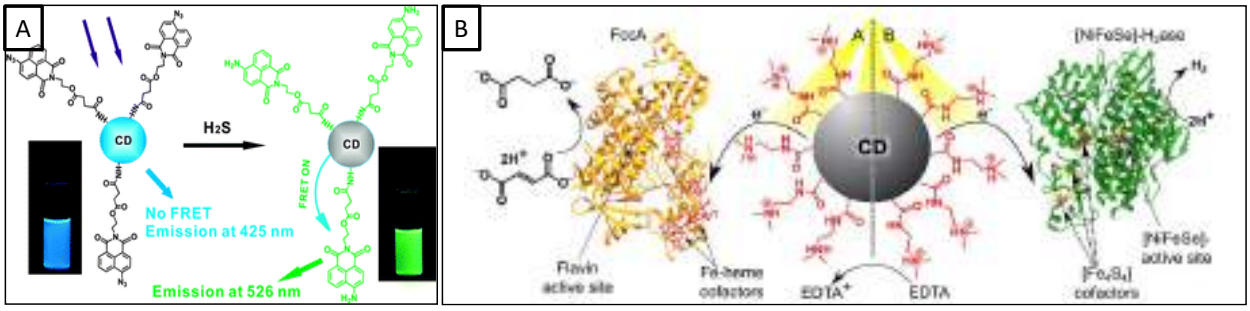

Figure 7: A) Carbon dots as sensors (C. Yu et al., 2013) B) carbon dots as photocatalyst for H_2 generation (Hutton et al., 2016)

Photocatalysis:

a) Water Splitting: Carbon dots are used as co-catalysts in photocatalytic water splitting for hydrogen production. Their ability to generate reactive oxygen species (ROS) under light irradiation can drive chemical reactions.(Han et al., 2018b; H. Yu et al., 2016)

b) Pollutant Degradation: Carbon dots can help remove organic impurities from wastewater through photocatalytic degradation. This is crucial for reducing water pollution and achieving sustainable water treatment.(Saini et al., 2022; Yao et al., 2022)

The Reisner group developed solar-driven enzymatic catalysis using carboxylic-functionalized negatively charged and ammonium-terminated positively charged carbon dots. These dots facilitated catalytic H_2 generation and C-C hydrogenation under solar light with H_2ase and FccA enzymes. The positively charged carbon dots displayed excellent interactions and direct electron transfer to the enzymes, which have negatively charged surfaces rich in glutamate and aspartate. This electrostatic interaction enabled strong surface attachment and efficient electron transfer. The ammonium-terminated positively charged carbon dots achieved impressive enzyme-based turnover numbers, with 6000 mol succinate (mol FccA)$^{-1}$ and 43,000 mol H_2 (mol H_2ase)$^{-1}$ after 24 hours.(Hutton et al., 2016)

Optoelectronics:

a) Light Emitting Diodes (LEDs): Carbon dots can be incorporated into LEDs to enhance their efficiency and color purity, making them a more attractive choice for lighting applications.(Hola et al., 2014; T. Yuan et al., 2019)

b) Photodetectors: Carbon dots can be integrated into photodetectors, improving their performance and sensitivity for applications in optical communication and sensing.(Feng et al., 2020; F. Yuan et al., 2016b)

Efficient spatial charge separation is crucial for high-quality photovoltaic devices. To address this, a composite system using carbon dots and ZnO NPs is designed. Through cyclic voltammetry, it is established that a staggered type II alignment for the carbon dots - ZnO NPs composite. Spectroscopic studies demonstrated the electron transfer from carbon dots to ZnO and a simultaneous hole transfer in the opposite direction, promoting charge separation. This system holds promise as a photovoltaic material. Our device incorporates the carbon dots - ZnO NPs composite with PEDOT:PSS and ITO as hole transporters and Aluminum as electron transporters (see Fig. 27). Varying the composite's thickness resulted in an impressive 11-fold increase in photocurrent. These findings pave the way for innovative light-harvesting systems.

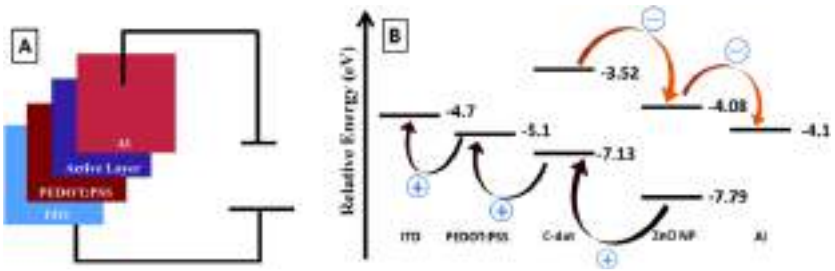

Figure 8: Optoelectronic application of carbon dots.(Barman et al., 2017)

Carbon dots have an array of applications across various fields due to their remarkable properties. Ongoing research and development continue to explore new applications and enhance the potential of these nanomaterials in addressing an extensive range of challenges in science and technology.

VI. Conclusion

In conclusion, carbon dots have emerged as a versatile and promising class of nanomaterials with an extensive variety of applications, from bioimaging and drug delivery to energy storage and sensing. Their unique properties, such as tunable photoluminescence, low toxicity, and ease of functionalization, make them potential candidates for various scientific and technological endeavors. Furthermore, their eco-friendly synthesis from easily available carbon sources aligns with the growing emphasis on sustainable materials. As we look to the future, carbon dots are expected to play an increasingly significant role in advancing fields like medicine, environmental monitoring, and electronics. Their continual development, which may involve enhanced synthetic strategies, novel applications, and an in-depth understanding of their fundamental properties, will pave the way for innovative solutions to pressing global challenges, making C-dots an exciting avenue for research and technological progress.

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CRITICAL STUDIES *in* SCIENCE

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Dr. Asish Kumar Das

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CHAPTER 11
Prospects and Problems of Social Media - An Integrative Review

Dr. Pranab Kumar Das*
Assistant Professor, Department of Microbiology
Asutosh College, Kolkata

Abstract:

In today's society, social media has become one of the ways to keep in touch with everyone. Before using social media, one must know what does social media mean? Social media is a mode of interaction between people where they can exchange photos, videos, images, ideas, and even chat with each other over the internet. Here people can exchange their views and ideas on any topic they have come across. Among the vulnerable group of users, children of various ages are prone to use social media as Facebook and WhatsApp; but there is a huge ambiguity of getting addicted to such internet users. Even though, social media platforms have nullified the distance between people: as they can even connect people who are the two opposite halves of the earth's hemisphere, and have brought people close to each other, still there are numerous drawbacks of using social media. People are getting convicted of abusing and bullying over social media, and above all, they signal the deterioration of society and point out the emotional drama of people. This paper discusses both the pros and cons of social media which is of immense concern nowadays.

Keywords: social media, prospects, problems, mobile phone, Facebook, WhatsApp

Introduction:

In the present era, social media plays a very important role in our lives. Today social media has a huge impact on all aspects of the ways people live their daily lives. On this platform; people are gradually becoming completely dependent day by day.

In general, social media denotes a collective term for both various applications and different websites. It helps to focus on communication interaction and collaboration. Therefore, people can keep in touch with their families, friends, and different communities through the use of these social media platforms. Moreover, very recently; John R. (2018) reviewed the heuristic approach to the impact of social media's prospect and loss in the 2016 American Presidential Elections.

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https://biotechnology.adamasuniversity.ac.in/bionext-2023-conference/

Abstract
Colon cancer (CC) with its increasing incidence and mortality rate creates havoc on healthcare. The 5-year survival rate has increased in recent years. However, the incidence rate has increased in developing countries and in young individuals, propels further research on novel therapies. Tankyrase 1 (*TNKS*) known for its pro-tumoural roles, induces Wnt/β catenin signalling. It destabilises the Axins to enhance β catenin activity. Thus, controlling tankyrase activity can counter excessive Wnt-β catenin pathway, which majorly contributes to CC pathogenesis. Apigenin is known for its anti-cancer properties, already been shown in different cancers. This study targeted divulging precise anti-cancer mechanisms of apigenin by revealing the potential interactions with tankyrase 1. Genetic alterations and expression of *TNKS* were checked by assessing TCGA data. A genetic alteration frequency of 12% and increased mRNA expression of *TNKS* were observed. The top interacting partners of *TNKS* revealed by the PPI network via STRING. Functional enrichment analyses (ShinyGO) revealed *TNKS* and its interacting partners are involved in telomere maintenance, cell cycle, and Wnt signalling. Apigenin showed good binding affinities with the PARP catalytic domain (-9.6 Kcal/mol), further confirmed protein-ligand interactions through MD simulation analyses. Apigenin induced cellular toxicity in colon cancer cells as well and when applied with its metabolite, luteolin these two compounds showed better activity. These compounds also reduced colony forming ability of CC cells either alone or in combination. Apigenin further suppressed the gene expression of CCND1 and MYC in CC cells to exert anti-CC activities, revealing apigenin as a Tankyrase 1 inhibitor.
Keywords: Apigenin, Colon cancer, Phytochemical, Tankyrase

BN23-OP8

Microwave assisted dried cells of the fungus *Arthrinium malaysianum* is a potential biomaterial that can adsorb heavy metals: Sustainable bioremediation

Swagata Roychowdhury[1]; Sanmitra Ghosh[2]; Saptarshi Chatterjee[2]; Rajib Majumder[1*]
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Keywords:
Arthrinium malaysianum; Chromium; XPS-XRD-FTIR analysis; SEM-EDX.

Abstract
We have explored the potential biosorption of toxic heavy metals by the heat dried biomass of one Ascomycota *Arthrinium malaysianum*and also examined that the biosorption involved several mechanisms like surface physical adsorption, chelation, oxidation &reduction. The interactions between fungal biomass and hexavalent chromium were meticulously investigated by several cutting-edge techniques like FT-IR (Fourier Transform-Infrared Spectroscopy), XRD (X-ray Diffraction), and XPS (X-ray Photoelectron Spectroscopy). Besides, we also performed FESEM-EDX (Field Emission Gun-Scanning Electron Microscopy-Energy Dispersive X-ray spectroscopy) imaging for visualization of the ultra-structure of fungal cell surface. It was evident that there were substantial changes of the surface architecture post heavy metal absorption. In present manuscript, we performed biosoprtion studies with toxic hexavalent chromium (Cr) as tested heavy metal and promising results were found. Thus, we suggest that the above mentioned fungal biomass could be a very useful biomaterial for future translational research.

BN23-OP9

Chromosomal studY of mutagenesis induced by x-rays (120 r) on fresh water fish, *Oreochromis mossambicus*

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Abstract
Ionizing radiations as X-rays, γ-rays, are known to create damage to living tissues and chromosomes. The living world is exposed to these hazardous radiations from time to time. The present study is carried out to access the capability of X-rays to incur chromosomal damage in aquatic organisms taking *Oreochromis mossambicus*, commonly known as tilapia, a common fresh water fish as the test organism. Both sexes of the fish were exposed to X -rays of a dose of 120r (*in vivo*). Mitotic chromosomal metaphase plates were prepared from gill cells of treated specimens, after seven different time intervals as 15 min, 1 hr, 16 hr, 48 hr, 1 week (168 hr.), 2 weeks (336 hr.) and 1 month (720 hr.) of exposure. Investigation of the data reveals that X-rays is an inducer of seven different types of chromosomal aberrations, e.g. Chromatid break, Iso chromatid gap, Iso chromatid break, Sub chromatid gap, Centromeric dissociation, Translocation and Ring chromosome. It was also observed that maximum chromosomal aberration was yielded after 48 hr of exposure to X rays (8.63%), and that Sub chromatid gap type of aberration was the maximum (1.64%) among the various types of aberrations, followed by centromeric dissociation (1.02%). Further, statistical analysis of our data expresses the view that the radiation effect was somewhat time dependent and sub chromatid gap type of aberration is more prevalent in some chromosomes than the other types.
Key words: *Oreochromis mossambicus*, X-irradiation, chromosomal aberrations, sub chromatid gap.

BN23-OP10

Physicochemical and microbiological factors affect the development of viable but non-culturable and resuscitation states of *Vibrio cholerae*

Anusuya Debnath[1]
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Abstract
Vibrio cholerae can endure harsh environmental conditions by transitioning into viable but non-culturable (VBNC) form and resuscitate upon return of appropriate conditions. In this study, we assessed the impact of physicochemical and microbiological factors, on the development of VBNC state and subsequent recovery by temperature upshift. In estuarine water, AN59 loss culturability gradually in a time span of 77 days. However, in fresh water, AN59 showed rapid decrease in the culturable cell count within 10 days. When different number of cells in different growth phases were used for VBNC induction, higher inoculum size of late log phase culture i.e. 10^6-10^7 cfu ml^{-1} was found to be critical to enter VBNC state. While in starved cell, 10^4-10^5 cfu ml^{-1} of initial inoculum could enter VBNC state. The addition of glucose, GlcNAc and mannitol differentially affects progression into VBNC, while the addition of tryptone, yeast extract and casamino acid lead to early entry into VBNC state and shorten the length of recovery period. The addition of pyruvate slows down the process of VBNC induction, but in combination with C-source such as glucose, GlcNAc, and mannitol, the VBNC condition achieved approximately 15 days earlier whereas the addition of protein source tryptone, yeast extract and casamino acid, the VBNC condition reached 7 days later. These findings demonstrated that the parameters examined in this study played distinct roles in the progression of VBNC induction and recovery. Changing a single element can have an impact on, and even halt, the formation of the VBNC state. These findings provide new insight to help design further studies to better understand the mechanisms which trigger the development and regulation of the VBNC state.
Keyword: *Vibrio cholerae*, viable but non-culturable (VBNC), resuscitation, C-source, pyruvate

BN23-OP11

Lethal effect of overexpression of Mycobacteriophage D29 proteins on Mycobacterial growth: An insightful study on Nucleotide biosynthesis.

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CHAPTER 13
Gut Dysbiosis Leading To Metabolic Disorder

Nilanjana Bose*
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Abstract:

Type 2 DM along with hypertension and obesity has evolved as the largest public health burden across the developed as well as developing economies. Adaptation of sedentary lifestyle, coupled with consumption of high fat junk food along with genetic predisposition have been identified as the most important risk factors behind this boom of metabolic menace. The crucial role of the gut microbiota and alteration of glucose homeostasis by their active metabolites contributing to the pathogenesis of type 2 diabetes mellitus has evolved as an interesting field of research. In healthy individuals, the complementing symbiosis with gut microbiota forms a balanced metabolic system. Risk of absorption of endotoxins rises with disruption of the gut barrier. Indiscriminate use of antibiotics leads to inhibition of gut flora and dysregulation of glucose homeostasis and promotes dysglycemia. Available Data on diabetes mellitus and its relationship with gut microbiota among in rural/ urban people in eastern India is very limited. It would be potentially intriguing to explore the relationship between the gut microbiota and and pathophysiological basis of diabetes progression. It might help to find specific biomarkers unique to the population and choose an appropriate treatment strategy for long-term outcome.

Key words: T2DM, Obesity, gut dysbiosis, gut microbiota.

Introduction:

Type 2 Diabetes Mellitus refers to the cluster of metabolic disorders sharing common phenotype of hyperglycaemia, primarily attributed to the inability of the functional beta cells to deliver enough insulin to overcome the insulin resistance. Progressive apoptotic decline in the functional beta cell mass in the face of sustained glucotoxicity, lipotoxicity, coupled with sedentary lifestyle, and genetic predispositions, further deteriorates the glucose homeostasis.

Autoimmune destruction of the pancreatic islet cells by the circulating auto antibodies (ICA/GAD) contributes towards the pathogenesis of Type 1 Diabetes Mellitus. Genetic predispositions (both Thrifty Gene as well as Monogenic

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CHAPTER 9

E3eA Commentary on Plot-Tools in Protein Structure Validations: From the Ramachandran Plot to the Complementarity Plot

Dr. Sankar Basu*

Assistant Professor, Department of Microbiology
Asutosh College, Kolkata

Abstract:

A picture is worth a thousand words. Many branches of Science have been historically benefited with plots and visual analyses (lately, image processing and deep learning) alongside with traditional number crunching. In Molecular Biophysics, one such problem is the structure validation problem in proteins which stands with a history of plot-tools being effectively serving the complex problem to its complete resolution. Spanning across six decades, validation of protein structures (from experimental to modeled) dates back to the legendary Ramachandran Plot (with its never ending growth and modern-day applications) to the relatively recent innovation of the Complementarity Plot (CP), establishing the dual nature of complementarity as the physical basis of both binding and folding of proteins. Lately, CP has been extended to serve as a trustworthy free-energy predictor utilizing supervised learning in the form of a comprehensive web-server (EnCPdock: https://www.scinetmol.in/EnCPdock/) that can be directly used in the design of protein interfaces. The commentary recapitulate the history of structure validation with a special emphasis on plot tools, highlighting key features and important discoveries worth re-visiting.

Keywords: Proteins, Protein Science, Structure validation, Ramachandran Plot, Complementarity Plot

There is a saying that "A picture is worth a thousand words" which has lately been made more realistic and (should we say) literal during setting of the de-facto standard for natural language processing tasks in image recognition and computer vision [1]. In that same spirit, images or visual analyses have served overwhelmingly in different branches of science, elegantly complementing all number crunching exercises. In molecular biophysics, the protein folding problem is one of the major unsolved (at least partially) problems branching out in a trifurcated way to (i) the thermodynamic problem, (ii) the kinetic problem and (iii) the structure prediction problem. Although the structure prediction problem

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SCIENCE:

CONTEMPORARY CAREER OPTIONS IN MATHEMATICS

Dr. Prabir Rudra
Assistant Professor, Department of Mathematics
Asutosh College, Kolkata

Introduction

From technology to health, mathematics is a subject with applications in most professional domains. Applicants with a focus on mathematics and related fields, such as statistics, frequently have excellent employment opportunities. There is no doubt that mathematical careers abound in the home of the great Aryabhata. It's the ideal subject to advance your profession because it fosters reasoning, critical thinking, and time management. Enthusiastic math students have a wide range of interesting career options that could lead to some groundbreaking discoveries that can alter the way math is seen. Not only is it one of the best employment paths for math majors, but it is also an excellent way to learn about its fundamentals. In many real-world situations, it offers a more straightforward approach and aids in problem solving. The US Bureau of Labor Statistics projects that between 2018 and 2028, there will be a 30% increase in the number of mathematicians employed, with a median wage estimated to reach $88,190. For pupils that are passionate about math, this opens up a world of new opportunities.

You might opt to work in a variety of fields or get ready for a teaching position with a degree in mathematics. You can significantly increase your chances of finding employment if

Chapter

Polysaccharides from Ganoderma

Extraction, Chemical Features, and Bioactivity

By Prasenjit Maity, Konkuri K. Maity, Indranil Chakraborty, Ipsita Kumar Sen, Soumitra Mondal, Gajendra Nath Maity, Sukesh Patra

Book Ganoderma

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ABSTRACT

For centuries, humans have harnessed the healing properties of medicinal mushrooms for treating various ailments. Among these fungi, Ganoderma stands out as a prominent and extensively utilized species in

CHAPTER 3

Role of Self Help Groups in Women Empowerment and Problems Faced by the SHG Members of Coastal Villages of Ramnagar Block-I in Purba Medinipur District, West Bengal

Debabrata Chanda*

Assistant Professor, Department of Geography
Asutosh College, Kolkata

Abstract:

Women's empowerment is a process whereby women become able to organize themselves to increase their own self-reliance to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination (Keller and Mbwewe, 1991). Empowering women is one of the most crucial concerns of Millennium Development Goals of the United Nations. 'Empowerment' is regarded as an essential objective to improve the well-being of marginalized women in India. The perceived successes of self-help groups (SHG) programmes have encouraged their widespread application across India, becoming the primary mechanism to empower women. The self-help groups support entrepreneurship development and income gathering activities that fit around the needs of home makers and which overtime, can empower women. This study investigates the empowerment of rural women in coastal villages of Ramnagar block-I in Purba Medinipur district of West Bengal through their participation in the entrepreneurial activities of SHGs. The findings show that taking part in the entrepreneurial activities SHGs has a significant impact on uplifting the socio-economic empowerment in the women of this study area. This study also attempts to analyse various problems faced by the women members of SHGs while participating in the income gathering activities. Finally, co-operation and trust among the group members are developed by repeated social interactions, which are facilitated by weekly meetings of SHGs.

Keywords: Women empowerment, Self-help groups, Socio-economic development, Major constraints.

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Chapter 5
Impact of Urbanization on Mirco-climate and Environmental Quality in Barasat Municipality: A Geospatial Analysis

Jhoney Barui, Debabrata Chanda, Yogia Dutta, and Uttam Mukhopadhyay

Abstract Urbanization gained speed due to industrial development worldwide. The high growth of world urban population transformed the surface of the earth into concrete. The huge transformation of land helps to change the climate worldwide especially in urban spheres. The micro climatic change on urban entities has huge impact on urban environmental quality and vice versa. The research focuses on examining the negative impact of urban transformation over the past decade on the microclimate and environmental quality of Barasat Municipality. Land Surface Temperature (LST) of Barasat Municipality was quantified by using Landsat data as a tool of micro climatic change. On the other hand, different environmental parameters have been estimated to extract the changing scenario of Urban Environmental Quality. The urban environmental quality has been calculated by using multicriteria decision making like CRITIC and TOPSIS method. The evolving correlation between Urban Environmental Quality and Land Surface Temperature was assessed through the application of bivariate Moran's I and LISA (Local Indicators of Spatial Autocorrelation). The result showing the unexpected increase of temperature and the degradation of urban environmental quality and there is a strong association between them. Proper urban planning is the only way to combat this issue.

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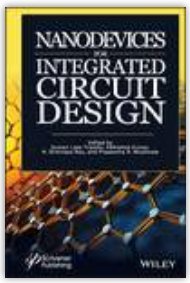

Nanodevices for Integrated Circuit Design

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BETEL VINE CULTIVATION IN WEST BENGAL: PROBLEMS AND PROSPECTS

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Abstract :

Betel leaves have become a part in the everyday life of the Indian people. Chewing of the leaf, or Pan as it is called, is an ancient habit among all classes of people. It is considered auspicious to make offerings with the betel leaf and arecanut on occasions such as weddings and worships. The leaves are considered to have medicinal properties and produce a stimulatory effect on brain, liver and the heart. Betel leaves have a fairly good selective demand and are produced as a profitable cash crop in the Bengal delta and elsewhere in the north and peninsular India. The cultivation of betel vine is highly labour intensive and is particularly suitable for small holdings. Once established, a betel vine garden becomes a sustainable source of employment and cash to meet the farmer's day to day needs. In India, West Bengal produces about 2/3rd of India's total production, where evidently Purba Medinipur plays the leading role. Here an attempt has been made to analyse the spatial distribution of productivity of betel vine cultivation and to identify the major problems faced by the betel vine growers during production and marketing as well as the future possibilities. Therefore, relevant information, particularly with respect to practical account of cultivation, cost-benefit, pricing and problems related to production and marketing have been collected from the farmers of the study area.

Keywords: Betel vine, Area, Production, Constraints, Prospects.

Spatio-temporal Change of Urban Entity: Comparative Analysis between Barasat and Rajpur-Sonarpur Municipality

Jhoney Barui[1*], Debabrata Chanda[2] & Uttam Mukhopadhyay[3]

[1]*UGC JRF, Department of Geography, University of Calcutta, Kolkata*
[2]*Assistant Professor, Department of Geography, Asutosh College*
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Abstract

Urbanization speeded up after independence in India as every urban sphere had been influenced by the partition of India especially in the eastern part of the country. Barasat and Rajpur-Sonarpur are two important municipalities lying near the city of Kolkata and under the Kolkata Metropolitan Area and both the towns contribute in man-force to the city of Kolkata. Barasat is situated in north-eastern part of Kolkata whereas Rajpur-Sonarpur is located in the southern part. The urban growth of both the municipalities have been accrued from census of India which indicates the temporal change of the towns. Apart from that Land Use and Land Cover map and Urban Expansion Map has been prepared to know about the changing spatial pattern of urbanization. The result showing the extreme transformation due to urbanization in both the municipalities in an unplanned manner. Barasat stands after Rajpur-Sonarpur in terms of transformation of greeneries and other surfaces into built-up spaces. Both the municipalities need proper urban planning for the sustainable growth and development.

Key Words: *Urbanization, Urban Growth, Spatio-temporal change, Urban Expansion, Infrastructural Development*

1. Introduction: Urbanization has progressed worldwide with accelerated speed after industrial revolution. World urban population was less than 3 per cent in 1800 (Hauser & United Nations Fund for Population Activities, 1982) and after 2010, approximately 50% of the world population is living in urban areas (Watson, 1993) and it will be 68% by mid-twenty-first century (Kundu & Pandey, 2020). With the progress of urbanization, development and transformation

Migrations in South Asia

MIGRATION, MEMORIES, AND THE "UNFINISHED" PARTITION

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4 Problematising the Concept of Home

Generational Memories among East Bengali Migrant Families

Subhasri Ghosh

Introduction

Taking the 1947 Partition that created the two nation-states of India and Pakistan as the backdrop, this chapter attempts to explore the intense sense of nostalgia deeply embedded in the psyche of the Hindu migrants from East Bengal (East Pakistan from 1956 and Bangladesh from 1971) who had to abandon their motherland following the Partition and seek refuge across the border in the Indian state of West Bengal. Culling information from oral narratives as also personal documents in the form of memoirs, the chapter would highlight how, through the memories of a lost homeland, these first-generation migrants try to cling to their roots and heritage and try to pass these on to the next generations. Although the concept of a museum to honour the memories of a lost homeland is steadily gaining ground in India, on the lines of Holocaust memorials in Europe, it is essentially these memories that help in unravelling the human dimension of Partition and thus open up knowledge about its unknown facets.

At the stroke of midnight on 14 August–15 August 1947, as the whole world slept, India awoke to light and freedom. While for many it meant freedom from nearly 200 years of colonial bondage, for some, it was a time of uncertainty and trauma – thousands of minorities began their tryst with destiny trekking across the border to seek succour amongst their fellow co-religionists. Uprooted from their home and hearth, East Bengal, to the migrants on the eastern side of India, is "not merely a physical structure or a geographical location but always an emotional space" to be sustained essentially through memory.[1] Most had to leave their homeland for good with the very clothes they had on. For some that this was the final adieu to their homeland was not clear. Snehalata Biswas of Tangramari village in undivided Nadia took several years to understand that they would never return. In her words, "My husband assured me that we would return after some time. I therefore buried all the utensils in our courtyard".[2] Thus bereft of material possessions on this side of the border, they hang on to their precious memories of East Bengal, which many still consider their "motherland". Preservation of memory of the eye-witnesses is cardinal since there is less emphasis on the non-material aspects of cultural heritage. There is, however, increasing

A Discourse Analysis of Twitter Communication to Foster Digital Diplomacy Between India and China

Reema Roy, Piyush Kumar, Moumita Chatterjee, Chandrajeet Sarkar

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Abstract

Online social media platforms enable an individual or agency to communicate interactively and exchange of opinion. Twitter is a very popular platform worldwide for the exchange of opinions. The chapter tries to identify the effectiveness of social media diplomacy and effectiveness of the communication made on Twitter. The study wants to identify the role of Twitter in maintaining the international relations between India and China. There are three key factors that can be identified as the basis of the relationship. Those are business, boarder tension, and the cultural exchange. The study has taken five Twitter handles of Sun Weidong, Chinese Ambassador to India, @China_Amb_India, and India in China, Embassy of India Beijing, @EOI Beijing, for the analysis. The discourse analysis method and content analysis have been adopted by accessing Twitter data and news contents of the study. This study also investigates the impact on the users preceding the word cloud. This study shows a new path in the area of open diplomacy.

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Contents

Livelihood of Elderly People in the Age of Globalisation: A Micro - Level Investigation in Jhero Village of Hooghly District in West Bengal

Dr. Reema Ro

Introduction:

Livelihood simply means the way an individual lives by fulfilling the necessities of life. It further means the activities performed by an individual to lead his/her life. It describes how an individual is dependent on many things for his/her food, shelter, and clothes for the ultimate goal of living a good life. According to Robert Chambers, "a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living". Elderly or old age consists of ages nearing or surpassing the average life span of human beings. The boundary of old age cannot be defined exactly because it does not have the same meaning in all societies. The Government of India adopted 'National Policy on Older Persons' in January, 1999. The policy defines 'senior citizen' or 'elderly' as a person who is of age 60 years or above. For the purpose of our study, the same definition is used here.

For a good living, people need resources. Quality of life can be ensured if there is capacity of the people to afford them. But, even in the 21st century world, there are so many issues and challenges faced by a large section of the society. On one hand, when there is development on the agenda, there are efforts to uplift the downtrodden, to distribute resources among the have-nots, while on the other hand, the gap between the poor and the rich continue to widen. According to a report of Oxfam International, 73% of the wealth generated in 2017 went to the richest 1%. The rich are getting richer at a faster rate while the poor are still struggling to earn a minimum wage to afford the basic necessities of life.

Globalisation has brought about many changes in the world. The impact of globalisation has

CAREER GUIDANCE : CHOICES BEFORE YOU

Edited by

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Principal

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Associate Professor in Bengali

ASUTOSH COLLEGE

Career Guidance : Choices before you

(A volume on career options for college students)

Edited by

Dr. Manas Kabi

Dr. Chandramalli Sengupta

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MASTERING CONTENT WRITING

Dr. Priyanka Roy

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Introduction:

One of the ways to communicate with other people is the written medium. Whether it is to express feelings or to convey information, written text is very important. Written text used to mean only printed media such as books, newspapers, periodicals, leaflets or booklets used in advertising campaigns. In the age of electronic media, written content becomes the basis of news, propaganda, advertisement or entertainment. Audio and visual sequences revolved around him on radio and television. The audibility and visibility of the subject takes the place of the text. A big change in this mass media can be observed after the internet. The written medium returns in a new form. Newspapers published their electronic version (e-version), common people started writing blogs to express their opinions, social media gave a new direction in interaction. Using this new medium, various commercial organizations are constantly presenting new topics on blogs, Facebook pages or websites for their promotion, advertising or public relations. Not only presenting, but also constantly researching how to make written text attractive to internet users, through catchy headlines, images, topic selection by brain mapping, etc. Currently, various political parties have also started the process

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প্রাগাধুনিক বাংলার প্রাচীন কাব্যকথায় দেবী দুর্গার আগমনী

বিক্রম দাস
শিক্ষক, বাংলা বিভাগ

বাঙালির প্রাণের পার্বণ দুর্গাপূজা। সাম্প্রতিক অতীতে এই দুর্গাপূজা ইউনেস্কোর সম্মানে সম্মানিত হয়েছে, যা বিশ্বব্যাপী বাঙালির গরিমাকে আরো গৌরবান্বিত করেছে। কিন্তু বর্তমানে অধিকাংশ থিম পূজার ভিড়ে কোথাও কি হারিয়ে যাচ্ছে দুর্গাপূজার প্রাচীন ঐতিহ্যের উত্তরাধিকার? বাঙালি কি ভুলে যাচ্ছে দুর্গাপূজার পুরোনো শিকড়ের কথা? থিম পূজার পাশাপাশি অবশ্যই সাবেকী পূজাও সমানভাবে প্রচলিত। কিন্তু খাস কলকাতার নামীদামী পূজামণ্ডপগুলোতে থিম পূজারই জয়যাত্রা। এই থিম-সংস্কৃতি ডানা মেলেছে মফস্সলের পূজা-মানচিত্রেও। কিন্তু এই সামাজিক পরিসরে বাস্তবের মাটিতে যে পূজাকে ঘিরে এতো উন্মাদনা, সেই পূজার উৎপত্তি কীভাবে? তার অতীত ঐতিহ্য কেমন ছিল, এই বিষয়ে বর্তমান সময়ের অধিকাংশ বাঙালিই উদাসীন ও অবশ্যই বিস্মৃত। এই অবসরেই সেই জন্য আগমনীর প্রারম্ভে বাঙালির দুর্গাপূজার সাহিত্যিক ঐতিহ্যকে একটু স্মরণ করে নেওয়া যেতে পারে। আরো বিশেষভাবে বললে, বলতে হয়, বর্তমান নিবন্ধের উদ্দেশ্য প্রাগাধুনিক বাংলা সাহিত্যের বিপুল পরিসরে দুর্গাপূজার প্রচলন, দুর্গা মহিমা বা মাহাত্ম্য প্রচার প্রসঙ্গে আলোকপাত– প্রাচীন কাব্যকথায় দেবী দুর্গার আগমনীর অনুসন্ধান।

প্রাচীন মার্কণ্ডেয় পুরাণের অন্তর্গত শ্রীশ্রীচণ্ডী অনুসারে, চিত্রগুপ্তবংশীয় রাজা সুরথের রাজত্ব ছিল বঙ্গের বলিপুরে (বর্তমানে বোলপুর)। কোলাবিধ্বংসী নাম্নী শত্রুদের দ্বারা তিনি রাজ্যভ্রষ্ট হয়ে বনবাসে যান। সেখানে সমাধি বৈশ্যের সঙ্গে তাঁর বন্ধুত্ব হয়। মেধস বা মেধা মুনির আশ্রমে গিয়ে তাঁরা মুনির নিকট দেবী মহামায়ার মাহাত্ম্য শোনেন এবং দেবীপূজায় ব্রতী হন।এবং পরে দেবীর কৃপায় রাজা নিজের রাজ্য পুনরুদ্ধার করেন। জনশ্রুতি অনুযায়ী, রাজা সুরথ এবং সমাধি বৈশ্য পশ্চিমবঙ্গের গড় জঙ্গলে মেধস মুনির আশ্রমে দেবী দুর্গার পূজা বা দুর্গোৎসব করেছিলেন। এটিকেই পৃথিবীর প্রথম দুর্গাপূজা বলা হয়েছে। বর্তমানে গড় জঙ্গল বলতে পশ্চিমবঙ্গের বর্ধমানের দুর্গাপুর অঞ্চলকে বোঝায়। রাজা সুরথ বসন্তকালে দেবী দুর্গার পূজা করেছিলেন। তাই এই উৎসবকে বলা হয় 'বাসন্তী' পূজা বা "বসন্তকালীন দুর্গোৎসব"।[১]

কিন্তু যে উৎসব বসন্তকালের উৎসব ছিল, সেই উৎসব শরৎকালের শারদীয়া উৎসব হল কীভাবে?– এই প্রসঙ্গে আলোকপাত করতে হলে শরণাপন্ন হতে হবে বাঙালির প্রথম মহাকবি কৃত্তিবাস ওঝা রচিত 'শ্রীরাম পাঁচালী'র। সেখানেই তিনি প্রথম শরৎকালীন দুর্গাপূজার প্রসঙ্গ উত্থাপন করেছিলেন। কিন্তু কবি কৃত্তিবাস যে মূল রামায়ণের অনুবাদ করেছিলেন, সেই বাল্মীকির রামায়ণে দুর্গাপূজার প্রসঙ্গের কোনো উল্লেখ নেই। এমনকি তুলসীদাসের 'রামচরিতমানসে'ও এই প্রসঙ্গের অবতারণা করা হয়নি। মার্কণ্ডেয় পুরাণ অনুসরণে বাংলায় এই শরৎকালীন দুর্গাপূজার

সাহিত্যে আধুনিকতা—সমস্যা ও সম্ভাবনা: প্রেক্ষিত 'শেষের কবিতা'

বিক্রম দাস

ঔপন্যাসিক রবীন্দ্রনাথ ঠাকুরের শেষপর্বের একটি গুরুত্বপূর্ণ উপন্যাস 'শেষের কবিতা'। 'শেষের কবিতা' উপন্যাসের পূর্ব নাম ছিল 'মিতা'। 'প্রবাসী' পত্রিকায় ১৩৩৫ বঙ্গাব্দের ভাদ্র থেকে চৈত্র মাস পর্যন্ত এই উপন্যাসটি যখন ধারাবাহিকভাবে প্রকাশিত হয়, তখন এর নাম ছিল 'শেষের কবিতা'। 'শেষের কবিতা' উপন্যাসটি ১৩৩৬ বঙ্গাব্দের ভাদ্র মাসে (১৯২৯ খ্রিস্টাব্দ) বিশ্বভারতী গ্রন্থালয় থেকে গ্রন্থাকারে প্রকাশিত হয়।

'শেষের কবিতা' উপন্যাসের প্রকাশকাল বাংলা সাহিত্যের ইতিহাসে এক অভূতপূর্ব অধ্যায়। প্রায় সত্তর বছরের প্রান্তসীমায় উপনীত হয়ে এইসময় যেন অন্য এক নতুন গদ্যভাষা ও নবতর রচনাশৈলী সৃষ্টির দুর্দম উল্লাসে রবীন্দ্রনাথ পুনরায় উদ্বুদ্ধ হলেন। বাংলা সাহিত্যে 'কল্লোল' পত্রিকা প্রকাশিত হওয়ার পর তৎকালীন সাহিত্যক্ষেত্রে যে ফেনিল উদ্দামতার সঞ্চার হয়েছিল তার সঙ্গে পাল্লা দেওয়ার জন্য, তৎকালীন তরুণ সাহিত্যিকদের আরেকবার আধুনিকতার স্বরূপ চোখে আঙুল দিয়ে দেখিয়ে দেওয়ার জন্যই যেন তিনি কলম ধরেছিলেন। 'কল্লোল' পত্রিকার তরুণ লেখকদের উদ্দেশ্য ছিল বাংলা সাহিত্যের পুরোনো রূপ ও পুরোনো ঐতিহ্যকে লঙ্ঘন ক'রে নতুন বাস্তবতার আমদানি করা। 'কল্লোল' পত্রিকার তরুণ সাহিত্যিকদের এই সাধনাকে সেইসময় যেমন একদল সমর্থন জানিয়েছিলেন, তেমনই অন্য দল এর প্রবল বিরোধিতাও করেছিলেন। সাহিত্যে আধুনিকতা বলতে কী বোঝায়, সাহিত্যে আধুনিকতার মানদণ্ডই বা কী এবং সেই আধুনিকতা সাহিত্যে কতটা প্রতিফলিত হতে পারে অথবা জীবনের কতখানি সেই আধুনিকতার মধ্যে গৃহীত হতে পারে—এইসব প্রশ্ন নিয়েই সেইসময় বাংলার সাহিত্যিক মহলে তর্ক-বিতর্কের ঝড় উঠেছিল। সাহিত্যে শ্লীলতা-অশ্লীলতা, রুচি-বিকৃতির প্রশ্ন নিয়েও কম তর্ক-বিতর্ক হয়নি সেইসময়। এই সাহিত্যিক আলোড়নে নিরপেক্ষ থাকতে পারেননি রবীন্দ্রনাথও। এই প্রেক্ষিতেই আধুনিকতার লক্ষণ কী সেই সম্পর্কে বলতে গিয়ে এবং আধুনিকতার সম্পর্কে তাঁর নিজের ধারণা স্পষ্ট ক'রে বোঝানোর জন্য এই সময়পর্বে নানা উপলক্ষে

2020 and 2021 would perhaps be remembered by most for all the wrong reasons – personal losses, loss of employment, change in livelihood, economic turmoil, medical challenges, isolation, battle all around – the virus outside and the disease within. But it would also be remembered by some, if not many, as the years which led to gross changes in thinking and life approaches. Perhaps no other event had shaken global humanity as much, for the last few decades.

Against this backdrop was this book born – a product then of tumultuous times. The virus and more like it are inevitable, if humankind chooses to continue thus, unabated. The pandemic is a grim warning of further and more such. We could try –the green way, through flora-fauna and nature, to conservation and respect for other's existence, to concern for habit-habitat, to awareness of global-local, from social commitment to individual well-being. The decision is ours –entirely.

Let us then consciously move from barrenness to green, from darkness to wisdom…hereafter.

Supatra Sen, faculty Asutosh College, alumnus Presidency College completed M.Sc., M.Phil., M.Ed. and Ph.D (Botany) from University of Calcutta, is winner of 'Environmentalist of the Year', 'Best Faculty' and 'Ecological Restoration' Awards. With three decades of teaching and 110 international research publications she edits e-journal 'Harvest.'

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Supatra Sen

MENTAL HEALTH IN COVID ERA: SUSTAINABILITY IN ANTHROPOCENE

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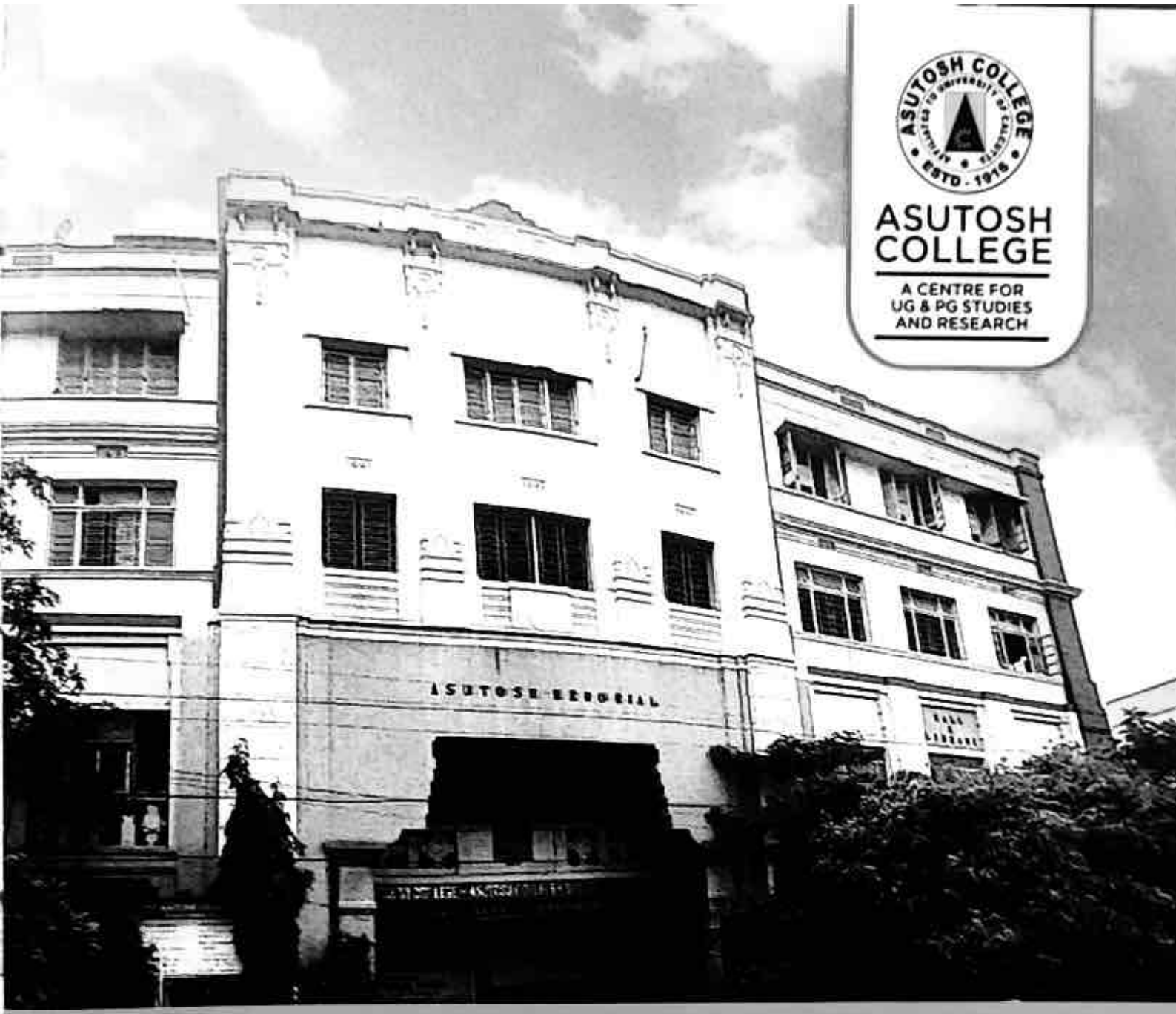
MENTAL HEALTH IN COVID ERA:SUSTAINABILITY IN ANTHROPOCENE



Critical Studies in HUMANITIES

Volume - 1

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Socio-Economic Conditions of Street Children: A Case Study In India

Dr. Gourab Ben

Introduction

The term "street children" refers to children for whom the street is more than their family. It includes children who might not necessarily be homeless but who live in situations where there is no protection and no guidance from responsible adults. 'Street children' is a term used to refer to children who live on the streets. They are deprived of family care and protection. Most children on the streets are between the ages of about 5 and 18 years. According to J.M. Swart, "a street child is any girl or boy who has not reached adulthood for whom the street has become her or his source of livelihood and who is inadequately protected and supervised." They live in abandoned buildings, parks and on the street itself. To study the meaning of a street child, a brief comparison between street children of the third and first world countries is very important. The street children of first world countries tend to be over the age of sixteen and only stay on the streets for a few months before returning home. Street children of third world nations are much younger than sixteen and stay on the streets for up to several years.

Categories of Street Children

UNICEF (2012) defines street children "as anyone under the age of 18 who either lives on or works on the street". According to this definition, there are 3 types of street children-

- Street Living Children: These are children who live alone on the street, public spaces or night shelters. They may have run away from their family and have no responsible adult to look after them.
- Street Working Children: These are children who spend a majority of their time working on the streets or in public spaces but return either daily or occasionally to their families.

EXPLORING CONTEMPORARY RESEARCH IN GEOGRAPHY

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DEPARTMENT OF GEOGRAPHY
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ECONOMIC BACKGROUND AND CONDITIONS OF STREET CHILDREN: A CASE STUDY IN SELECTED WARDS OF KOLKATA

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ABSTRACT : *It is usually assumed that urbanization and economic expansion are linked and they are treated as important characteristics of national economic development and advancement. Though, quick urbanization also poses vast challenges for the social and physical environment, principally through the extensive scarcity and poverty that results from the rapid urbanization process. It is estimated that the total number of households in slums and pavements areas of Kolkata are living in poverty. Many of the urban poor of Kolkata live in slum and squatter settlements with congested, unhealthy shelter and a lack of basic services. The present article states the economic background of the street children in selected parts of Kolkata. The work also is an effort to determine the elementary causes responsible for growth of street children. The paper also evaluates the working scenario and economic activities of street children in the study area.*

Introduction

Different aspects such as economic development, poverty, disparity, domestic violence and low income are responsible the growth of abandoned children in urban areas. In many countries, street children are considered after their main survival activities. For example, vendors, street gangs, juvenile crimes. Street Children is a widely used term in the English language and has other names in other countries such as in Kenya they are known as 'Parking Boys,' the Philippines as 'Pogey Boys,' Brazil as 'Pivets' and India as

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HUMANITIES :

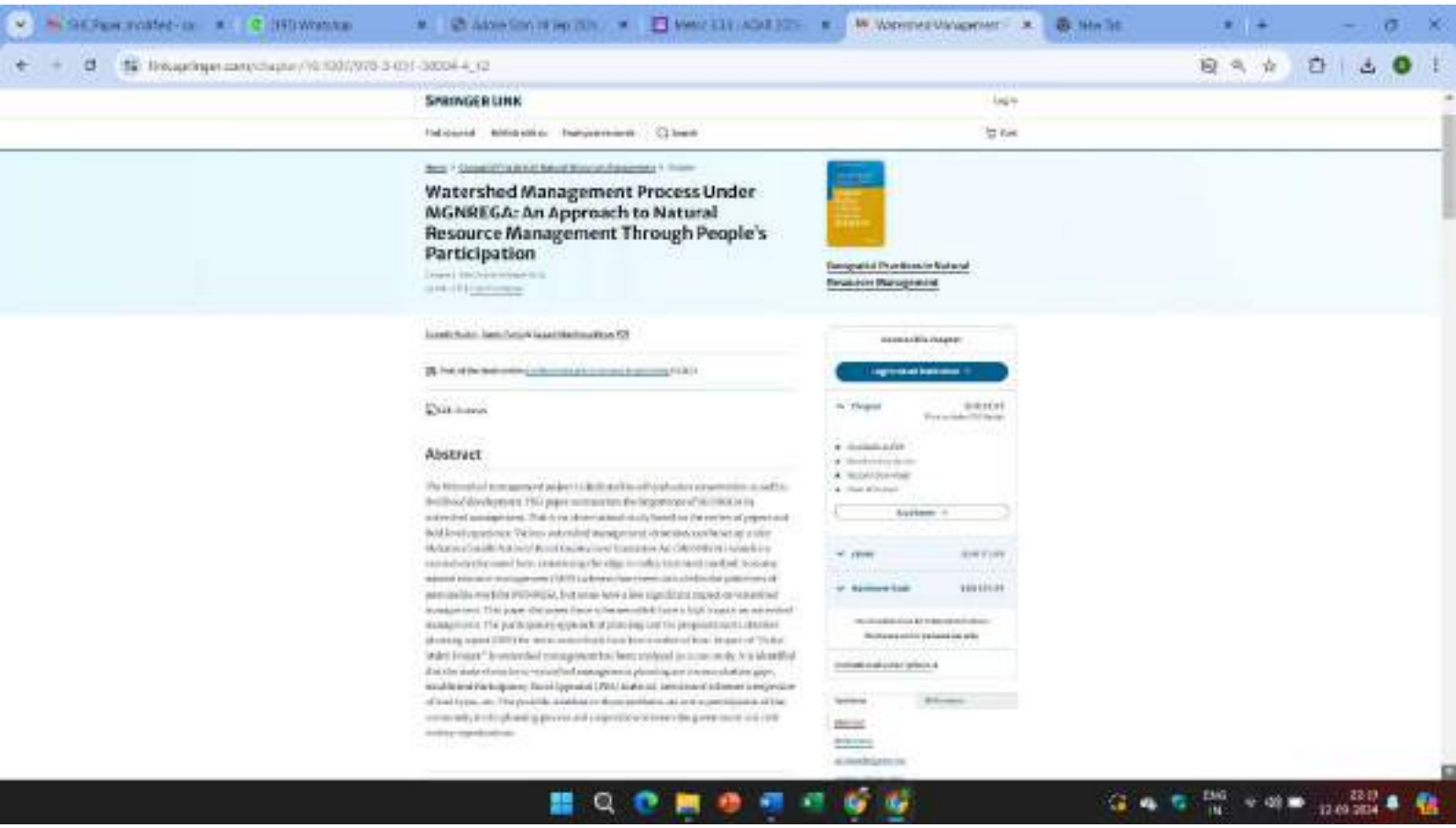
CAREERS IN MEDIA

Maulisri Chattopadhyay
Faculty, Department of Journalism & Mass Communication
Asutosh College, Kolkata

Introduction: salient features of careers in media

Media is always a lucrative term for the aspirants regarding the glamour and prospect apparently associated with the word. For the young minds it is always a new dreamy world dealing with creativity and writing ability, on and off camera handling and many other options available at large and small scale. A booming industry in need of young minds and new ideas often look for fresh graduates and post-graduates from different backgrounds. Being a multi-disciplinary and inter- disciplinary arena, graduates from different subjects other than the core communication discipline, mainly literature and language can find a new opening in higher studies and professional field. So, for the students it is always a great opportunity to shift away from traditional job profile to some unfamiliar and challenging working scenario. But one has to remember that it is a 24X7 job with emerging new demands. The highlighting areas can be listed as:

1. Field Reporting for both print and audio-visual media
2. Desk job in newspaper house as part of editorial team- both online and offline
3. Content writer for websites
4. Advertising Agencies
5. Public Relations – both public and private sector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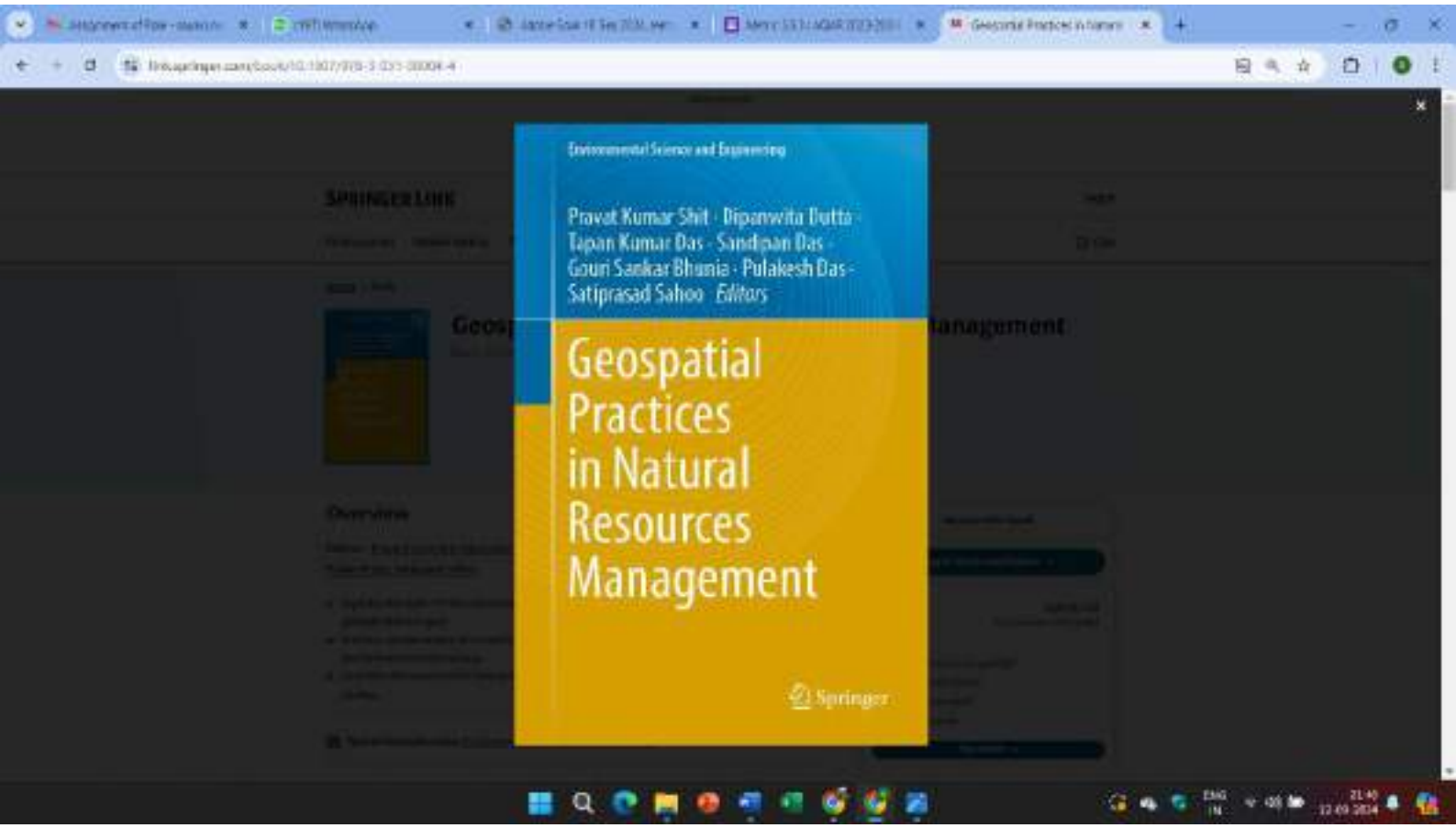
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SUSTAINABLE DISASTER MANAGEMENT AND HUMAN HEALTH

Sandeep Poddar, PhD
Debajyoti Bose, PhD
Najma Memon, PhD
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An Integrated Remote Sensing and Deep Learning Based Synthesis of Flood Monitoring and Modelling in a Region of the East Indian Coast

Anirban Kundu
Sumit Panja
and Sayani Mukhopadhyay*
Department of Geography, Asutosh College, University of Calcutta, Kolkata, India

Abstract

Natural disasters are one of the most unanticipated natural events that critically require detailed monitoring of the spatial dynamics of the intensity and the degree of devastation. Moreover, the casualties from a particular disaster event should be studied within the realm of land use regime to perceive a differentiated idea of the severity of the event under different land use. India, the third most disaster-prone country in the world, is experiencing a striking increment in the number of tropical cyclones, especially along its eastern coast. Set up in a region in the East Indian coast, this study tries to synthesize a detailed understanding of the degree of flood inundation and its disastrous impacts on different land use during the most recent tropical cyclone of the Bay of Bengal basin, 'Yaas.' Using a framework of integrating optical (Sentinel 2B) and microwave (Sentinel 1A) remote sensing images, the study depicts a

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ANALYSIS OF BANK LINE SHIFTING OF THE GANGA RIVER IN MALDA DISTRICT, WEST BENGAL

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Abstract

This study aims towards computing the temporal magnitude of river bank erosion of the Ganga River in Malda district in West Bengal. Here, the left bank of the river was utilised for computing the magnitude of erosion and deposition where village-level net erosion and deposition were calculated. This study has utilised digital dataset, ranging from 1977 to 2022. The entire methodology is dependent on remote sensing applications. During the post-Farakka period the sinuosity of the river stretch has increased while the overall magnitude of erosion has decreased over time. Presently, villages located immediately above the Farakka Barrage are experiencing fresh incidents of bank erosion. This study is significant in terms of understanding the magnitude of the hazardous nature of the bank erosion and it has changed over time.

Key Words : Bank erosion, Net erosion and deposition, Sinuosity.

1. Introduction

River is the natural conduit, going through the process of erosion, transportation and accretion that modify the landscape (Couper 2004). Alluvial floodplains experience different magnitudes of erosion and deposition along the river bankline. Since floodplains are intensively occupied by agricultural practices, erosion-

deposition dynamics significantly impact the cultural space (Ghosh, [illegible] Allen, 2004). Low-lying alluvial flood plains are the most populated areas in the humid tropics and this cultural landscape is affected severely by river bank erosion as these flat plains go through lateral channel migration phenomenon (Majumdar and Mandal [illegible] Iqbal 2010).

After completing its middle course, river Ganga enters Malda, where the incidence of bankline shifting of the river is highly dynamic. Here, the river drains the *diara* region, a low lying floodplain containing numerous cut-offs and palaeo channels of Ganga, Mahananda and Kalindri River (Lambourn 1918). Lateral meander migration and avulsions are evident processes. Consequently, numerous topographic signatures in terms of palaeo channels, meander scars and scrolls, cut-offs and several patches of water bodies are identical features (Hasannuzaman et al. 2023). The issue of bankline shifting in the lower course of the Ganga in Malda district is an age-old phenomenon where the construction of the Farakka Barrage in 1971 aggravates the issue. The construction of the barrage significantly altered the sedimentological and hydro-morphological character of the Ganga River in this region, resulting in various issues such as extensive erosion, char formation, lateral shifting, and river avulsion (Rudra 2010). Between 1979 and 2004, approximately 42.74 km^2 of land eroded due to lateral shifting of the Ganga River in the Malda district (Das and Samanta 2022) and it is also reported that nearly half a million of population lost their home. Thus the problem of channel shifting in Malda plays a pivotal role in modifying the socio-cultural attributes such as land use practices, local landscape, settlement location and most important it's consequence creates chaos as it displace a significant number of people away from the bankline (Islam et al. 2007).

Multiple studies have been done addressing the havoc of bank erosion in the Malda district where the nature of bankline shifting (Hasannuzaman et al. 2023), modelling the behavioural pattern of channel shifting (Ghosh and Saha 2023), the historical pattern of

DEVELOPMENT POTENTIALITIES OF FLORICULTURE IN BAGNAN I AND II BLOCKS OF HAORA DISTRICT

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Asutosh College, University of Calcutta*

Sayani Mukhopadhyay**
Associate Professor, Department of Geography,
Asutosh College, University of Calcutta**

Abstract

At present context of agriculture, floriculture plays a significant role in income maximization and livelihood development of the rural people of West Bengal. Bagnan I and II blocks of Haora district are the important floriculture pockets of West Bengal. These two blocks have been selected for the study. Here the study intends to find out the growth and developmental potentialities of floriculture in the study area. The study reveals that the production and area under flower cultivation of the district is increasing and developmental potentialities of floriculture are very strong in the study area, which will help to catch the modern floriculture opportunities.

Key words: Floriculture, Floriculture industry, Open field flower cultivation, Labour

1. Introduction

Floriculture generally deals with the production of such kinds of flower or ornamental plants which has domestic or international value. At present it is one of the sunrise sectors in India as well as in West Bengal and is becoming a modernised sector in agriculture also (*Biswas, 2013*). In West Bengal the characteristics of Haora district is predominantly an urban one. The agricultural activities are very

limited here (only 57.44 % of total geographical area under cultivation). The area under main field crop is gradually reducing here because farmers are gradually transforming their cultivable land from main field crop to horticulture. 'Every year some farmers are converting their land from traditional crops to floriculture due to its great potentiality' *(Das, 2012)*. The economic returns of flowers cultivation are much more than the main field crops. 'The return from flower cultivation is much more than paddy and sometimes it could be three times' (*Bhattacharyya, 2013*). Bagnan I and II blocks of Haora district are mainly famous for its flower farming and thousands of families are engaged in floriculture sector from different Gram Panchayats like- Kantapukur, Orphuli, Khajurti, Bakurdah, Kamardah, Birampur, Ramchandrapur etc. The floriculture sector is playing an important source of income and gradually it helps the rural people to become economic self sufficient. So here the study tries to analyse the growth of floriculture and the developmental potentialities of floriculture in the study area.

2. Materials and methods

The work has been done with the help of secondary data. A field investigation is also been carried out in the study area. Secondary data have been collected from Directorate of Food Processing Industries and Horticulture, Government of West Bengal, District Statistical Handbook, Haora, Electronic Articles & different E-sources. The secondary data has been analysed through Annual Percent Growth Rate and Linear Regression methods. The analysed data is represented here through different thematic diagrams. The Maps have been drawn in QGIS software and diagrams have been done in Microsoft Excel.

NAVIGATING CLIMATE CHALLENGES: INSIGHTS FROM THE IPCC SYNTHESIS REPORT

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Abstract:

Climate change is a pivotal global challenge with far-reaching consequences across environmental, societal, and economic dimensions. This paper tries to explain the major facets of the synthesis report published by the Intergovernmental Panel on Climate Change more lucidly. The report explores environmental shifts, emphasizing the threat of rising global temperatures and sea level rise, leading to habitat alterations and increased vulnerability of coastal areas. The escalating frequency and intensity of extreme weather events, including hurricanes, droughts, floods, and wildfires, underscore the urgency of addressing climate change to mitigate human displacement, loss of life, and economic disruptions. Climate change's influence on agriculture and food security is examined, revealing potential risks to global food production and the livelihoods of vulnerable populations. The study further delves into health-related implications, emphasizing the spread of diseases and heightened health risks associated with changing climate patterns. Additionally, the social and economic impacts are discussed, with a focus on the disproportionate effects on marginalized communities, exacerbating existing inequalities. The interconnectedness of climate change with global economic consequences is elucidated, highlighting potential damages to infrastructure, increased healthcare expenditures, and disruptions to various industries. Moreover, the study addresses the imminent

threat to biodiversity, emphasizing the need for conservation efforts to counteract the impacts of climate-induced habitat changes. In conclusion, the work underscores the critical relevance of climate change across diverse sectors, urging a comprehensive, collaborative, and urgent global response to mitigate its adverse effects and pave the way for a sustainable and resilient future.

Introduction:

In the face of unprecedented challenges posed by climate change, this work meticulously examines the observed warming trends and their unequivocal human-induced causes, emphasizing the irreversible impacts on ecosystems and vulnerable communities. With a focus on adaptation and mitigation efforts, the report underscores persistent gaps and urgent needs, especially in underdeveloped nations. Future projections are explored, emphasizing the critical role of sustained emissions reductions to mitigate risks. The expanding landscape of climate change impacts, including threats to health and biodiversity, demands swift, coordinated action. The report delves into the likelihood and consequences of unavoidable changes, the intricacies of carbon budgets, and the imperative of achieving net-zero emissions. Mitigation pathways, including the concept of overshoot, are scrutinized, providing a comprehensive guide for informed policy decisions and transformative global actions toward a sustainable future.

The Synthesis Report of IPCC Sixth Assessment Report (AR6) provides an overview of climate change knowledge, its effects, hazards, and mitigation strategies. It incorporates key conclusions from the Sixth Assessment Report. It is divided into three parts: Current Status and Trends, Future Climate Change, Risks, Long-Term Responses, and Near-Term Responses. The report emphasizes the interconnectedness of climate, ecosystems, biodiversity, and human societies, the importance of diverse knowledge, and the linkages between climate change adaptation, mitigation, ecosystem health, human well-being, and sustainable development.

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CHAPTER 2
Assessing Urban Growth and Transformation of Kolkata: A Review

Sreya Mukherjee[1]
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Asutosh College, Kolkata

Sayani Mukhopadhyay[2]*
Associate Professor, Department of Geography
Asutosh College, Kolkata

Abstract:

The analysis of urbanization trends in India reveals a consistent and upward trend. Kolkata, one of the prominent metropolitan cities has been selected for analysing urbanisation trends. After detailed review of literature, it is evident that Kolkata's urbanization is not only marked by population growth but also area expansion. The expansion of built-up areas in Kolkata witnessed a notable acceleration from the year 1973. However, in the contemporary context, the city stands as a prime example of urban saturation, relying primarily on vertical growth to accommodate its burgeoning population. This shift towards vertical expansion is a testament to the limited available land and the imperative to optimize existing space efficiently. Kolkata's saturated urban landscape calls for innovative urban planning and infrastructure development to sustain its growing populace. From a demographic perspective, it is worth noting that despite disparities in the male and female population, both segments exhibit an upward trend. This indicates that Kolkata's urbanization is not only characterized by numerical growth but also by the evolving composition of its residents. This transition towards urban life significantly impacts the socioeconomic landscape of the city's population. As with any major societal shift, these changes bring both positive and negative consequences. It is essential to delve into these aspects comprehensively, taking into account the multifaceted implications of urbanization in Kolkata. Understanding these effects, both beneficial and adverse, is crucial for policymakers and the community to navigate the urbanization process effectively while mitigating its negative impacts.

Keywords: Urbanization; Kolkata; Population growth; Urban land use; City planning.

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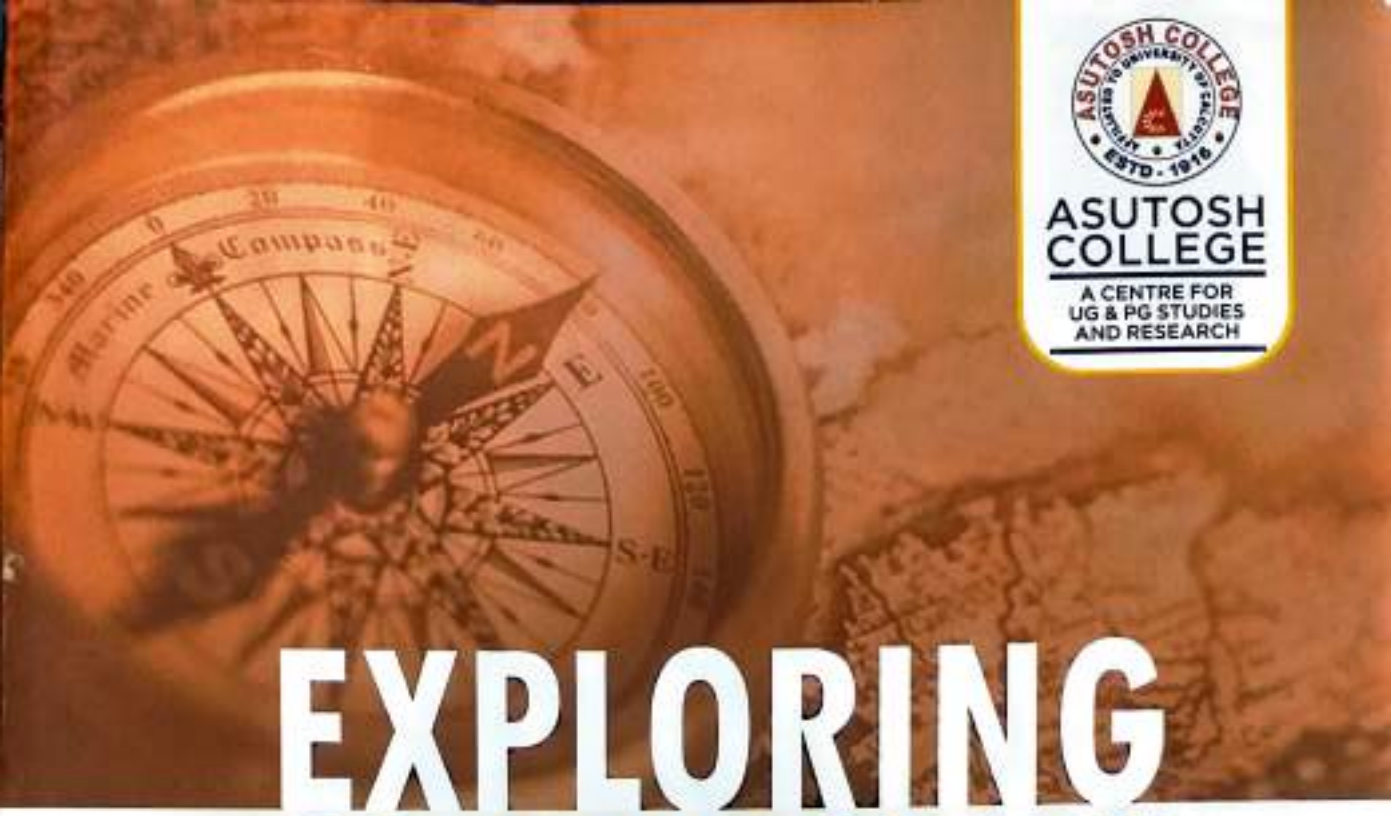

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CHAPTER 1
Towards Zero Hunger: Abiotic Stress on Crop Plant Physiology and Productivity

Dr. Supatra Sen*
Associate Professor, Department of Botany
Asutosh College, Kolkata

Abstract:

Coupled with climate change, abiotic stress is causing havoc to crop physiology, yield and yield quality. With the SDG 2 target of Zero Hunger to an unprecedented 8.5 billion by 2030 such massive loss of agricultural yield and economy poses a huge challenge. Detailed research on the varied plant responses to environmental stress and the biotechnological interventions to combat abiotic stress could usher in a new era of Sustainable Agriculture.

Keywords: seasonal environmental stress, stress responses, sustainable agriculture, stress physiology

Climate Change and Abiotic Stress:

With climate change already taking serious proportions, abiotic/environmental stress is significantly on the rise and is expected to take mammoth proportions in the near future. Temperature (low and high), water (drought and flood) and salinity stress have become the most important limiting factors to crop productivity, supply and ultimately food security. Abiotic stress causes substantial decline in crop yields through negative impacts on plant growth, physiology and reproduction. The rapidly changing seasonal patterns due to global warming, is providing additional fuel to the already deteriorating environmental scenario. Significant stress effects are damaged photosynthetic machinery, oxidative damage and membrane instability while the ability to withstand these stresses varies considerably from one species to another. They possess powerful sensors or signal transduction mechanisms that connect biophysical stimuli and biochemical events which guide them toward optimal growth, development and survival.

The report of COP 15 states that the percentage of drought affected plants has more than doubled over the last four decades. When plant roots get limited water supply or when transpiration rate is very high due to prevailing environmental conditions, plants are exposed to water stress. Water deficiency leads to water

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CHAPTER 2

Effect of low molecular weight mulberry leaf peptide(s) (0.5 – 3.0 kDa) on antioxidant enzyme activity of the cellular protein of silkworm larvae

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Dr. Suchisree Jha
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University of North Bengal, Siliguri

Dr. Palash Mandal
Assistant Professor, Department of Botany
University of North Bengal, Siliguri

Abstract:

Two important cultivars of Mulberry (*Morus alba* L., Moraceae) plant S1 and S 1635 were extracted with low molecular weight peptides (0.5 – 3.0 kDa) with high anti-oxidative properties. These are exhibited by the expression of antioxidative enzymes.

Keywords: Peptide (s), antioxidative enzymes, silkworm

Introduction:

Silkworm larvae (***Bombyx mori L.***), a monophagous insect under Euarthropod feed on white mulberry leaf (***Morus alba* L.**, Moraceae). Low molecular weight leaf peptides (0.5 – 3.0 kDa) with the high antioxidative value of S1 and S1635 cultivars of Mulberry increased the activity of antioxidant enzymes of cellular protein from silk gland, gut or digestive system, fat body and haemolymph of 5th instar silkworm larvae (72 h after 4th moulting) reducing the oxidative stress during feeding. Fig. 1 (A-E)

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CHAPTER 3
A Review on Canalization- Nature's Protection Against Variability

Dr. Sriparna Datta Ray*
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Abstract:

Canalization or robustness towards genetic or environmental changes that occur in organisms living in a state of equilibrium is fundamental to all organisms. While there is strong evidence related to canalization as an evolved trait that varies among the different genotypes, the developmental and genetic mechanisms that produce this phenomenon are very poorly understood. For evolutionary biology, canalization is a determinant of evolvability since the phenotypic variation can be altered in response to genetic differences. The current review explores canalization in various organisms including both invertebrates and vertebrates, it outlines the different aspects of genetic canalization and environmental canalization. It also summarizes the molecular basis of genetic and environmental canalization and discusses the predominant candidate protein that contributes to genetic canalization, viz. the molecular chaperone protein HSP90. The role of HSP90 as a genetic capacitor has also been studied extensively by scientists and study reveals that genetic buffering is only a part of HSP90 functioning and that HSP90 interacts with mutations in diverse ways. The importance of canalization lies on its influence on views of complex-trait evolution. A genetically canalized system has evolved to become less sensitive to the effects of mutation. The current review shows the linkage among genetic canalization, environmental canalization and developmental stability. Further understanding of canalization at a mechanistic level will require conceptual and methodological approaches that shall integrate quantitative genetics and developmental biology.

Key words: Canalization, Genetic canalization, Environmental canalization, Molecular chaperone protein HSP90, Genetic capacitor, Morphogenesis.

Definition: Canalization is an essential pattern signifying protection against variability. It is done for maintenance of constancy of some adult patterns. For example, general shape of a head, or a wing, or a leg. It reflects the depth of the "grooved" pathway followed by the developmental process; the deeper the groove, the more difficult for the pattern to be changed.

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CHAPTER 4
Insect visitation pattern in three tropical entomophilous trees (*Lagerstroemia speciosa, Peltophorum pterocarpum and Delonix regia*) in an urban landscape

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Abstract:

Jarul (*Lagerstroemia speciosa*; LS), Gulmohar (*Delonix regia*; DR), and Copper Pod (*Peltophorum pterocarpum*; PP) are three summer-blooming tropical entomophilous trees that we have selected for our insect visitation pattern study. These trees are present in abundance in most green spaces and avenues of Kolkata city and adjoining municipality areas. We have selected 03 sites each from South Kolkata, Howrah (in the west), North (Belghoria), and East (Bidhannagar) for insect sampling. These flowering trees attract different insect pollinators and information on which is less documented. An attempt has been made to identify the diversity of entomofauna visiting the flowers, estimate pollen production per inflorescence, and pollination-linked flower-to-fruit conversion of DR. PP and LS. The insects recorded visiting frequently in the DR PP and LS have been overlapping with the highest similarity between LS and DR (JLS-DR = 0.785) and lowest within DR and PP (JDR-PP = 0.425). Flower-visiting entomofauna were catalogued either as pollinators, or occasional visitors as their visiting purposes not understood from their activity. It indicated, that entomofauna were more frequent on LS than DR or PP. In total, 15 morphospecies, out of which 06 are hymenoptera, 02 Coleoptera, 05 Lepidoptera, 01 Diptera, and 01 Hemiptera, were documented. *Apis sp.* (*A. mellifera* most prevalent) followed on Xylocopa sp. (*X. latipes and X. pubesscens*) is the most abundant insect pollinator. The study also reveals that insect diversity and abundance are moderately similar in DR. PP and LP.

Keywords: Flower visitation, pollination, urbanization, entomophily

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CHAPTER 5
Bacillus spp.: The Multifunctional Soil Diazotroph

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Abstract:

Endospore forming *Bacillus* spp. functions as dominant soil habitant and they are found in diverse ecosystem. Due to their unparalleled metabolic and genomic diversity, this soil diazotrophs are recently used commercially by different relevant technologies in different agro-biotechnological industry to produce different agricultural products as plant growth regulators and disease suppressors. Due to their multiple roles in ecosystem like nutrient cycling, and conferring of stress tolerance to plants, they can be referred to as the most beneficial rhizobacteria. This versatile group of bacteria helps plants in a diversified manner like of nutrient acquisition, overall growth enhancement by the phytohormone production, and giving a protective shield from different abiotic and biotic stresses. Therefore, many carrier-based preparations of *Bacillus* have been commercialized today as bio-agents that revolutionize sustainable agriculture.

Keywords: bacilli, bio agents, endospore, rhizobacteria,sustainable agriculture.

Introduction:

Plant growth-promoting rhizobacteria (PGPR) exerts their positive effects on plant development (Ahmad et al. 2008) but the role of *Bacillus* like, *B. megaterium*, *B. circulans*,*B. coagulans*, *B. subtilis*, *B. azotofixans*, *B. macerans*, *B. amyloliquefaciens*, *B. velezensis*, as PGPR has been reported by many researchers(Fan et al. 2018; Chakraborty et al. 2021). Under the phylum Firmicutes, *Bacillus* comprises different species which play functionalroles in different aspects of human life (Logan et al. 2009). The genus contains 293 species/subspecies that extends from extremely pathogenic [viz. *Bacillus anthracis* (causative agent of anthrax) and *Bacillus cereus* (causes food poisoning)] to agriculturally significant microbes (viz. *Bacillus thuringiensis*, *B. amyloliquefaciens* and *Bacillus velezensis*) and also bacteria of various other industrial applications (Harwood et al. 1992;Nogi et al. 2005; Sanchis et al. 2009; Elshaghabee et al. 2017; Dunlap et al. 2019). Members of the genus *Bacillus* show great phylogenetic and phenotypic diversity. Therefore many species of this

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CHAPTER 7
Diversity and functional aspects of plant histone deacetylases

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Abstract:

Lysine acetylations of histones act a major post translational regulation that affects protein functions and gene expression. The fine tuning between Histone acetyltransferases (HATs) and Histone deacetylases (HDACs) is an important regulating factor in gene expression. HDACs regulate transcriptional repression by removal of acetylations from histones. Apart from the large number of the HDACs that has been associated in animals including humans, plant HDACs have emerged as a family of proteins with elaborate role in plant stress responses, immunity, reproductive and developmental programming. In this review we are focusing on the diversity and functions of various plant HDACs.

Key Words: Plant Histone deacetylases, acetylation,

Introduction:

In eukaryotes, core histones (H2A, H2B, H3 and H4) package DNA into chromatin. Post-translational modifications of the N-terminal tails of histone include acetylation, deacetylation, sumoylation, phosphorylation which serve as a critical regulatory point in gene expression (Pfluger et al., 2007). Genetic and biochemical studies in plants like *Arabidopsis thaliana* and *Oryzae sativa* (rice), have implicated the role of HDACs in biotic and abiotic stresses (Sokol et al., 2007; Stockinger et al., 2001: Vlachonasios et al., 2003; Pavangadkar et al., 2010; Bharti et al., 2004), flowering and seed germination (Deng et al., 2007; Bertrand et al., 2003; Han et al., 2007), gametophyte development (Latrasse et al., 2008) and cell proliferation during organ growth (Nelissen et al., 2005). The following article focuses on various histone deacetylases and their function in wide array of plant species.

2. Histone Deacetylases (HDACs) across major plant families:

2.1. HDACs in *Arabidopsis thaliana*

In *Arabidopsis*, twelve RPD3 like HDACs, only two class III sirtuin like(SRT1 and SRT2) and four plant-specfic Histone Deacetylase 2 has been reported (Chen

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CHAPTER 8
Metatranscriptomic analysis reveals the diversity of genes expressed by prokaryotes in mangrove sediments, Goa

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Abstract:

Mangroves are well-known for microbial activities and Goa is a rich repository of this ecosystem. The RNA-based metatranscriptomic approach is a novel tool to explore both the taxonomic diversity and biochemical functions of the composite microbiome of mangrove sediments. In this research, we compared the functionally active microbiome and the functions of their genes from mangrove sediments along Mandovi and Zuari estuary, Goa by metatranscriptomics approach. *Protebacteria*, followed by *Actinobacteria* and *Firmicutes* were observed as the dominant bacterial phyla while *Ascomycota* was the dominant fungal phylum from both the samples. However, the composition of lower taxonomic levels markedly varied among the samples. The functional annotation by Kyoto encyclopedia of genes and genomes pathway revealed that the abundance of genes involved in metabolism category was highest in two samples while clusters of orthologous groups could identify distinct difference in the group of genes between the samples. This is the first metatranscriptomic study from Goan mangroves and our results provide the first insights in the range of functions and microbial diversity in the sediments.

Keywords: Mangroves, metabolism category, metatranscriptomic, *Proteobacteria*, sediments.

Introduction:

Mangroves that cover one-fourth of the world's coastlines is a transitional ecosystem between land and marine environments (Li et al., 2022). The complex and diverse mangrove ecosystem is a rich niche of microbial species like bacteria, algae, protozoa and fungi that in concert contribute to the cycling of nutrients through food webs, biogeochemical cycling of atmospheric components like carbon, nitrogen, sulphur, phosphorus, hydrogen, methane and ammonia (Li et al., 2022). The nutrients supplied by mangrove forests foster the adjacent coastal waters for marine flora and fauna, protect the coastal zones by dissipating the sea-

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CHAPTER 10
Immunotherapy using mRNA: A Novel Era

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Abstract:

The advent of mRNA vaccines has revolutionized the field of preventive and therapeutic medicine, offering a potent, safe, and cost-effective alternative to traditional vaccines. These vaccines have demonstrated their efficacy in various domains, including infectious diseases, immunotherapy, genetic disorders, regenerative medicine, and cancer. The rapid clinical development and potential for swift, economical manufacturing have propelled mRNA vaccines to the forefront in combating the COVID-19 pandemic. However, challenges such as in vivo degradation, thermal stability, and targeted delivery remain. Nanotechnology has played a significant role in overcoming these hurdles, particularly through the development of lipid nanoparticles (LNPs) that enhance stability, biocompatibility, and delivery to desired cells and tissues. LNPs not only serve as a delivery vehicle but also protect mRNA molecules against factors that could compromise their efficiency. This review encapsulates the structure and function of mRNA vaccines, their manufacturing process, and current clinical trials. Despite the challenges, the potential of mRNA vaccines in preventing emerging and re-emerging infectious diseases is promising.

Keywords: mRNA vaccines, lipid nanoparticles (LNPs), infectious diseases, immunotherapy, genetic disorders, cancer, COVID-19.

Introduction:

Vaccination has historically served as the bedrock of public health strategies, acting as a pivotal tool in mitigating the proliferation of infectious diseases (Gote et al., 2023; Plotkin, 2014). Traditional vaccines have predominantly utilized inactivated pathogens, protein subunits, or viral vectors to stimulate protective immune responses. These established methodologies have been instrumental in thwarting an array of diseases, albeit with inherent constraints (Brisse et al., 2020). They often

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CHAPTER 12

Assessment of immunotoxicity by quantitative and morphological alteration correlated with ROS generation in haemopoietic cell population in *Labeo rohita* (Hamilton, 1822) exposed to Azadirachtin

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Abstract:

The increasing emphasis on the assessment and ecological monitoring of freshwater ecosystems has highlighted the necessity to deploy and subsequently evaluate appropriate biological indices. In the present study, haemopoietic tissue imprints and flowcytometric analysis were employed to assess the impact of plant pesticide, azadirachtin (at No Observed Effect Limit concentration) on the cellular compostion of head kidney cells from freshwater carp, *Labeo rohita*. The small lymphoid hemoblast decreased significantly throughout the experimental tenure whereas transient stages (i.e. basophilic erythroblasts, polychromatophilic erythroblasts and acidophilic erythroblasts) increased significantly suggesting the immediate requirement of younger erythroid cells into circulation post agrocontaminant exposure. The decline of reticulocytes (young and mature) and increase of erythrocyte (young and mature) cell population suggested the erythropoietic efficiency was increased in fish exposed to NOEL dose. Among leucocytes, the percentage of neutrophils rose and percentage of lymphocyte decreased significantly suggesting a possible impaired leukopoietic efficiency. Flow cytometric analysis clearly subdivided the entire head kidney cell population into two separate groups, viz. granulocytes and lymphocytes. In a time dependent and dose independent experiment, these two populations showed significant variation (*P* value .000 and .003).The Pearson correlation also suggested that both are negatively correlated (-.718). Result of flowcytometric measurement of ROS production showed a linear regression throughout the experimental tenure with 1.55, 1.89, 1.64 and 3.13 fold increases from the control

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CHAPTER 1
Differential equations and some applications to practical problems

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Abstract:

Differential Equations are the language in which we can express lots of natural phenomena in mathematical forms. Differential equations can solve many problems in various disciplines such as physics, chemistry, biology, economics, geology, social sciences, engineering, medical sciences, and many more. Differential equations are used as mathematical models that can not only solve practical problems but also explain and predict new facts about everything that changes continuously around us. Differential equations are very useful tools for determining the relationship between various dynamic quantities. In this article, we shall be dealing with some mathematical models involving ordinary differential equations of first order and first degree that apply to some practical problems to find their solutions.

Keywords: Ordinary differential equations of first order and first degree, Newton's Law of Cooling/Warming, Radioactive Decay and Carbon Dating, Chemical Reactions-Law of Mass Action.

Introduction:

An ordinary differential equation of first order and first degree is a differential equation that contains no derivatives other than the first derivative with power one and it has the mathematical form:

$\frac{dy}{dx} = f(x, y)$, where y is a function of x.

Differential equations can be used to explain and predict new facts for about everything that changes continuously. To formulate and use differential equation in real world system, first we have to identify the real world problems that need a solution. To solve a problem, first we collect data regarding the problem. Then a mathematical model is set up involving a differential equation which describes the real phenomenon of the problem as precisely as possible. Next we apply mathematical operations to get some sort of solution of the problem and then interpret the result.

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CHAPTER 2

Supply chain disruption under Covid-19 post-pandemic situation in two-layer supply chain with one retailer and two suppliers November 29, 2023

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Abstract:

This research aims to examine the supply chain disruptions and the existing initiatives among adoption of secondary supply services during the Covid-19 in Supply Chain Management. The ruthless attack of the novel coronavirus has left the entire supply chain coordination process into a big chaos. Like all other areas of socio-economic segments, the supply chain has also faced a lot of issues in the postpandemic era. Supply disruption is one of the biggest issues of all of them. The coordination problem of a supply chain with one retailer and two suppliers—one serving as the primary supplier and the other as a backup—is examined in this work. A random supply is experienced by the retailer as a result of various lockup issues during COVID-19 that may affect the main supplier's yield. We ascertain the best ordering strategy for the retailer and the manufacturing quantity for the primary supplier in order to optimize the anticipated profit of the centralized supply chain. Some qualitative insights are obtained by providing numerical examples.

Keywords: Covid-19 aftermath; Supply chain management; Stochastic demand; Supply Disruption.

Introduction:

This paper studies a two-layer supply chain consisting of one retailer and two suppliers, one is the main supplier and another is the backup supplier. The model extends to the theory of acceptance of backup suppliers and uses it skillfully including effort expectancy, performance expectancy, and facilitating position factors of both the suppliers. A quantitative approach survey questionnaire was conducted on supply chain members working in different segments of the supply chain regarding the question of having a backup supplier in the face of the supply disruption caused due to Covid-19. The sample was randomly selected to ensure

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CHAPTER 3
Trend Analysis of Time Series: A Review Of Methods

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Abstract:

In this article we deal with statistical data which relate to successive intervals or points of time. These are referred to as time series. There are four basic types of variations (Trend, Seasonal variations, Cyclical variations, Random variations) in a time series which are mutually super imposed and act to over a period of time to give the series its erratic appearance. To discover and measure the effect of these components and to isolate them individually is known as the analysis of time series. The main problem in the analysis is to identify the different components or factors at works and to isolate study and measure them independently. This is the way to obtain the maximum possible information from the given data arrange in a chronological order. But in this article we discuss only different methods for isolating the trend component of time series.

Keywords: time series; trend; seasonal variation; cyclical variation; random variation; Slutsky - Yule effect.

Introduction:

Time-series analysis is the basis for understanding past behaviour, evaluating current accomplishments, and to make an estimate about the future operations. It is also used for comparing the components of different set of data. The analysis of time-series makes time-series data of great importance not only in Economics but also in Scientists, Sociologists and for Biologists, etc.

According to **B. J. Mendel**, "Quantitative data on the past and present behaviour of an activity in combination with knowledge about the various factors that influence in makes possible to forecast their future magnitude. Thus, time-series data on a given activity are useful in deliberately forcing a comprehensive study of the factors affecting it, learning of its past behaviour, interpreting its current behaviour and forecasting its probable future magnitude."

A graphical representation of time series data will reveal that the changes over time. A time series which exhibits no change during the period will give a horizontal line. A critical study of the series reveal that the change is not totally

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CHAPTER 4
Nonparametric Methods For Estimating Survival Functions

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Abstract:

Survival analysis refers to a set of statistical methods for analysing time-to-event data. Here the variable of interest is time until an event occurs. Survival data commonly involves censoring which must be taken into account for drawing valid inferences. Survival analysis is not only applicable to biology and medicine, but it is also useful in various other fields including engineering, economics, among others. The present work discusses the fundamental concepts of survival analysis and reviews some nonparametric statistical methods for analysing survival data. Here we will primarily focus on the Kaplan-Meier product limit method and the actuarial life-table analysis.

Key Words: Censored data; hazard function; Kaplan-Meier estimate; life-table estimate; survival analysis; survival function.

Introduction:

Survival analysis is a collection of statistical procedures for the analysis of data in which the outcome variable of interest is time until an event occurs. Here, by event we mean death, disease incidence, relapse from remission, or any designated experience of interest that may happen to an individual. We commonly refer to the time variable as survival time (or failure time), since it gives the time that an individual has "survived" over some follow-up period. The time until the event occurs can be measured in days, weeks, years, or other units of time. For example, if the event of interest is heart attack, then the survival time can be the time in years until a person experiences a heart attack. We also typically refer to the event as a failure, because the event of interest usually is death, disease incidence, or some other negative individual experience. However, survival time may be "time to return to work after an elective surgical procedure," in which case failure is a positive event.

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CHAPTER 1

Magnetic susceptibility proxy for the palaeoclimatic study of some soil samples on the Eastern bank of river Barakar at Maithon, West Bengal

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Abstract:

This study involves the use of magnetic susceptibility as an indicator for the paleo-soil characterization with respect to the paleo-environmental conditions, weathering of tropical soils and the composition of preexisting source rocks. Soil samples collected from a vertical section were measured for magnetic susceptibility. Magnetic properties are compared to the redness rating of soil colour, which appears to be due to neoformation of haematite or maghemite during soil formation processes. The brownish gray coloured soils towards the top part of the section showing comparatively greater susceptibility values appears to indicate a long lateritization of the soil concentrating the Fe content of the sediment in the top part of the soil , whilst the grayish white coloured soil shows a gradual lower value of magnetic susceptibility towards the bottom of the soil section. Moreover, there is a lithologic overprint and the contribution of parent Precambrian acid igneous rocks and basic metamorphic rocks have to be considered.

Keywords: Precambrian, Haematite, Maghemite, Neoformation, Lateritization, Susceptibility.

Introduction:

The presence of iron oxides in various forms and amounts is the primary cause of soil magnetic properties. Iron oxide minerals can be pedogenic (i.e., formed by soil) or lithogenic (i.e., un-weathered minerals from the parent material). Iron (Fe) being the fourth most abundant element in the Earth's crust, Fe-containing minerals can be found not only in igneous rocks like basalt, gabbro, and granite, but also in metamorphic and sedimentary rocks. The parent material, soil age, and soil formation all have an impact on the concentration of (magnetic) iron oxides in soils- soil temperature and biological activity (Singer et al 1996, Fabris et al 1998).

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CHAPTER 4
Gender Disparity in Work Participation in Slums of KMC

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Abstract:

Work participation rate refers to the ratio between working population to total population and is an important indicator of economic well-being of a society. Gender discrimination and inequalities in economic as well as socio-cultural fronts are common in countries like India. In spite of several initiatives from the government to improve socio-economic status of women in the society, the current position is still quite dismal.

About one third of the total population of Kolkata Metropolitan Corporation (KMC) lives in slum areas where the situation is much worse. Due to several reasons like poverty, early marriage, lack of education facilities, female slum dwellers of KMC are forced to engage themselves in earning for the family from a very young age. They face discrimination in terms of income level, nature and type of work etc. in professional and domestic spheres which result in deterioration of their socioeconomic well being. The present study is concerned with the status of gender disparity in work participation of slum dwellers of KMC.

Key Words: Gender Disparity, Economic Status, Slums, Work Participation, Economic Parity Index

Introduction:

Theoretically it can be assumed that the overall development of a country is not gender biased and both men and women get equal benefits from the development process spread across the society. In reality, however, this concept is just a myth. In a developing country like India, gender disparity prevails everywhere- in educational, political, economic and health fronts between men and women. Gender inequality and its social consequences have multifaceted issues and Indian women are at a disadvantageous position in several ways. To eradicate this deep rooted evil from the society and involve women in various developmental activities, the government of the country has taken several steps. However, even after all the attempts, according to Global Gender Gap Report by World Economic Forum, India ranks

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CHAPTER 5

Biomass of Mangroves and its Temporal Variation in the Henry's Island in South-western Sundarbans

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Abstract:

The south-western Sundarban region is the western part of Indian Sundarban, densely populated but with a significant mangrove ecosystem. Investigating the biomass and its variation over time is critical to understand the state and evolution of this mangrove ecosystem, which is under considerable anthropomorphic pressure. The Henry's Island has a significant mangrove ecosystem degraded by diverse human activities including fisheries and tourism and appear to serve as a microcosm of the wider region. The biomass of this island is estimated by dividing the mangroves in four categories based on their sizes, namely, large, medium, small and very small areas. To understand temporal changes in biomass, the estimation is carried out for three different years in the island. The estimated biomass reflects the changes in the mangrove ecosystem caused by cyclonic devastation as well as by reforestation activities undertaken by the government and local communities.

Keywords: Mangrove degradation; above ground biomass; below ground biomass; mangrove plantation.

Introducion:

Mangroves form productive ecosystems and capable of sequestering a large amount of atmospheric carbon (Rahman et al., 2015). The biomass of a plant is its dry weight, a significant part of which is carbon. Due to obvious practical problems in measuring the dry weight of a plant, several allometric methods are developed to estimate the biomass of mangroves (Komiyama et al., 2008). In Machiwa and Hallberg (2002), the organic carbon dynamics of a mangrove ecosystem is investigated. In Komiyama et al. (2005), several allometric equations were studied for the estimation of the weights of several parts of a mangrove tree including its trunk, above-ground part, root and also leaves. In (Komiyama et al., 2000), Khan et al. (2007) and Jones et al. (2014), biomass and carbon stock in some mangrove species and in different ecologic systems were estimated and studied. The salinity level also influences the biomass of the mangrove species.

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CHAPTER 8

A Review Work on the Impact of the Tannery Industry on Surrounding Environment: Assessment through remote Sensing Technique

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Abstract:

Tannery industry is one of the oldest industries in the world. It is present in all the countries. However, in this industry, the chemical processes being utilized, cause a serious health hazard for the surrounding areas. The chemicals used here, ultimately disseminates in the biotic and abiotic environment. To make this industry sustainable, it is utmost necessary to ascertain the damage in a quick and error-free process. Remote sensing techniques coupled with GIS give us this scope. In this present study, a review work is carried out to find out the extent of environmental damage tannery industries are responsible for. Various treatment processes are also discussed. The principle of remote sensing and its use in this industry is also described here. Finally, a present map of Bantala tannery area is interpreted, which can be compared in further study in the coming years to have an idea of the rate of environmental damage in this area, owing to this industry.

Key Words: Tannery Pollutants, GIS technology, Environmental damage

Introduction:

Tanning is an ancient craft in India and has been practiced for many centuries as an industrial operation at the village level. With the progress of time, however, it has acquired the status of a mature industry playing an important role in the country's economy. The city of Kolkata (erstwhile Calcutta) has about 8,832 industrial units. Usually tannery wastes are characterized by strong colour, high BOD, high

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CHAPTER 2
Sun – About the Perpetual Resource

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Abstract:

The center of our solar system is the Sun. It is a perpetual resource i.e., renewable resource which cannot be exhausted though it is used by us continuously. Its structure as well as its different activities have been a matter of great research to scientists for a very long time. The total energy available from this perpetual resource is enormous. The nuclear fusion reaction is the source of energy within the Sun; moreover, obtained solar energy can be converted into electric power or can be used as thermal energy or in other forms of energy. The energy of the Sun is an essential part for human and every living organism in our earth. It is, therefore, a matter of great interest if we study the structure and activities occurring within the Sun.

Key Words: Photosphere, Chromosphere Corona, Solar flares, Solar cycle

Introduction:

The Sun is the treasure house of our universe and a permanent store house of energy. It is a large star (about 100 times bigger than Earth) and it is not ordinary, some features make it a special star in our universe. It is not so large compared to other stars we see in the sky. It is the nearest star we observe from our Earth. The internal structure of the Sun as well as activities have been matters of interest both for common people and scientists for a very long time.

Structure, Mechanism, and Activities

Among the celestial bodies, our Sun is a hot ball of gases and it looks glowing from the Earth in the daytime as it is closer to us than any other star observed in the sky. It is closer to Earth than other stars, but still far enough, approximately 150 million kilometers from Earth i.e., 400 times farther than the distance between Earth and the Moon. If we were too close to it, it would be too hot to live here. The Sun's surface is very hot, and the atmosphere over the Sun is even hotter. The Sun's core is the hottest part of all, it is actually sizzling 27 million degrees Fahrenheit or 15 million degrees Centigrade!

Internal Structures:

The layers of Sun from inside towards outside are core, radiative, and convective

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CHAPTER 3
A computational study of the Oscillator Problems

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Abstract:

A pedagogic problem which is most taught in physics classes in schools and colleges is a classical oscillator having diverse applications in the field of natural science. Yet, the problem becomes immensely complex when nonlinearity, stochasticity (or randomness) as well as higher dimensionality are introduced into the problem. Here we have reviewed a few such oscillator problems that arise in linear and nonlinear dynamical systems, and motivate the reader with a computational method of studying. This led to fascinating and thought-provoking outcomes in terms of kinetics and phase space trajectory. This study unfolds with a plethora of promising playgrounds in the parameter space backed with the *state-of-the-art* object-oriented programming language Python beyond the domain of approximation in analytical treatment.

Key Words: Computational Physics, Nonlinear Dynamics, Chaos, Applied Mathematics

Introduction:

Scientific methodologies leading to many discoveries have evolved in the last few decades to a very challenging arena. While much of the linear problems (e.g. oscillations exhibited by a simple harmonic oscillator) were easily solved in an analytical framework using the methods of linear algebra [1], the challenges remained whether highly nonlinear problems could yield to an analytic solution. Not surprisingly, the failure of the analytic methods in terms of the perturbative guesses at different order, which initially gained much popularity but eventually failed due to its lack of completeness to converge to the true solution, supplemented much focus towards other avenues of study [2]. With the advent of the usage of general-purpose computers outside the military domain and the technological breakthroughs leading to "technology on microchip", numerical computation started to gain popularity. The challenges remained in the availability of accurate numerical algorithms as well as the method of implementation of the prescription [3]. Not only a decade has passed while the difficulties in using high level programming languages complemented with scientific numerical libraries with limited applicability has been settled with the advent of supercomputing at peta-scale and exa-scale, as well as the object oriented programming languages [4]. Python, that traditionally been used as a

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CHAPTER 4
Let There Be (LED) Light

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Abstract:

The invention of the first incandescent bulb which was started by Sir **Humphrey Davy** in 1802, was later modified and patented by **Thomas Edison** in 1878. **Edison** used filament made from bamboo for his light bulb which was stable upto 1200 hours. Then, after the production of cost effective tungsten filament in 1911, bamboo filament was replaced by it. But still, these incandescent light bulbs were not so energy efficient due to large portion of energy loss as heat. Later, in the nineteenth century, due to energy crisis, better energy-efficient fluorescent tube was discovered by two German scientists, **Geissler and Plücker**. Then researchers began to find a suitable way to improve the energy efficiency and stability. In 1990s, compact fluorescent lamps (CFL) were available in the market for household use. In 1961, while working at Texas Instruments, **Robert Biard** and **Gary Pittman** invented an infra-red light emitting diode (LED) using GaAs semiconductor as substrate. After several modifications by various research groups, in 1962, **Nick Holonyak, Jr.** invented the first LED that produced visible, red light while working at General Electric using GaAsP substrate. In 1994, **Shuji Nakamura** invented first ultra-bright blue LEDs that served as the foundation for today's common commercial LEDs and rightly, he was awarded Noble prize in 2014.

Key Words: LEDs, Quantum Dots. Fluorescence, Calloidal Synthesis, High Quality.

Semiconductor nanomaterials, fall in the size range of 2-10 nm, show quantum confinement effect and are popularly termed as quantum dots (QDs). In the last two decades, nanoscience and nanotechnology has played a very crucial part in the synthesis of semiconductor nanomaterials. The high-quality QDs when synthesized under suitable conditions show very high photoluminescence property (quantum yield near unity) with high colour purity. Thus, they are potential candidates for applications in display devices, solar cells and bioimaging etc. When these QDs are used for LEDs, they are termed as QLED. Very recently, highly luminescent and very stable Red, Green and Blue LEDs have been made using these high-quality core/shell QDs. Since all the primary colours are obtained using these QLEDs, they are used in very high-resolution TVs that are popularly termed as QLED TVs. Samsung first patented this QLED

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CHAPTER 5
Multicomponent Reaction For Heterocycle Synthesis

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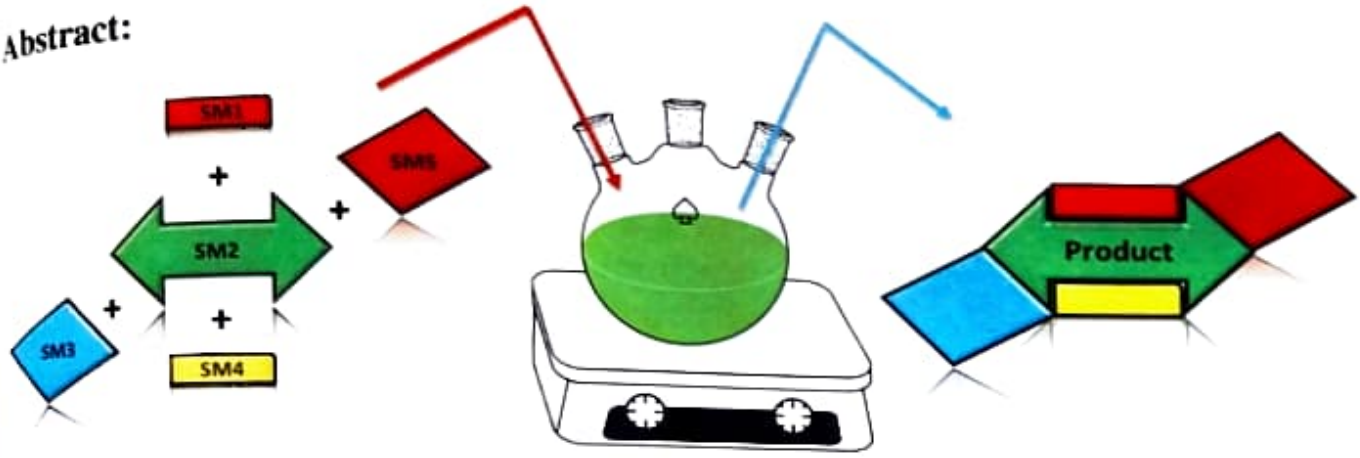
Abstract:



Heterocyclic systems are ubiquitous in naturally occurring and biologically active molecules. However, very often their synthesis needs multistep processes producing large amount of chemical waste. Therefore, the environmental impact of synthesis is very high. In this context multi-component reactions are very much alluring due to their concomitant atom economy, operational simplicity, mild reaction conditions, high yields of products, and single step operations. In this review, a number of representative reaction one-pot multicomponent protocol producing valuable heterocyclic scaffolds have been discussed.

Key Words: Multi-component reaction, one-pot, atom-economic, heterocycle, green chemistry.

Introduction:

Over the years organic syntheses have achieved a high degree of sophistication. There is hardly any complicated and medicinally relevant biomolecules or natural products that escaped the multistep total syntheses. However, here the target molecules are very often synthesized divergently or sequentially in many steps dumping chemical wastes in every step.

Moreover, an ideal synthesis should give the desired product in as few steps as possible in an environmentally benign way affording good yield of the target molecule.

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CHAPTER 7
Fourier Transform and the Quantum Harmonic Oscillator

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Abstract:

We look at an interesting way of solving the Quantum Harmonic Oscillator problem, which is less documented in standard textbooks on Quantum Mechanics, but provides a new insight to students and teachers alike, regarding a deeper connection with the theory of Fourier transform.

Key Words: Quantum Mechanics, Harmonic Oscillator, Fourier Transform

Introduction:

The Quantum Harmonic Oscillator problem is a cornerstone topic in the study of Quantum Mechanics, which is discussed in detail in most standard textbooks. Although there are several methods of solving this problem, the method employing the Fourier Transform is rarely discussed. Here we will try to elaborate on this method.

The Harmonic Oscillator is classically described by motion under a linear restoring force, which means a potential energy function $V(x) = \frac{1}{2}kx^2$, in one dimension. In the Quantum case, this corresponds to the Schrodinger equation taking the form :

$$-\frac{\hbar^2}{2m}\frac{d^2}{dx^2}\psi(x) + \frac{m\omega^2}{2}x^2\psi(x) = E\psi(x)$$

Here $\omega = \sqrt{\frac{k}{m}}$, the angular frequency. It is this second-order ordinary differential equation which describes the dynamics of a quantum particle in a simple harmonic potential.

The other piece of definition required for our purpose is the Fourier transform of a function :

Definition: Let $f(x)$ be a test function which is absolutely integrable, i.e. , $\int_{-\infty}^{\infty} |f(x)| < \infty$, then the Fourier transform of is defined as :

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CHAPTER 8
A Review on Strain Effects in Semiconductors

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Abstract:

In this review article, a brief introduction to strained-Si devices have been given. The effect of stress on carrier mobility, effective mass and other device performance parameters are discussed with reference to the published works. Different theoretical and experimental works are compared to understand the physics of strain in various device architectures. Finally, future scope of the strain technology in Field-Effect-Transistor (FET) devices are analyzed.

Key words: Strained-Si, Silicon, Germanium, Field Effect Transistor, FinFET.

Introduction:

After more than four decades of continued progress in CMOS technology, especially aggressive scaling in the last couple of decades, the CMOS dimension has now approached the fundamental limits. On the other hand, with the continuing reduction of device dimensions, the impact of process-induced stress on device performance is becoming increasingly important [1 – 8]. The induced stress improves the transport properties of channel materials and thus overall performance of the device improves even in nano-scaled dimensions. Apart from the Stress-induced performance improvement, several other materials, such as SiGe [9], Ge [10] and III-V [11, 12] semiconductors, are used along with new device designs, such as dual-gate [13], tri-gate or FinFETs [14], in modern Field Effect Transistors (FETs) to enhance the performance of nano-scale CMOS devices. Novel process techniques, such as atomic layer deposition (ALD), high-k dielectrics, and metal gates are also being used in exploratory device structures. As the end of the Si roadmap is approached, strained-Si channel offers a way to improve the FET device performance along with the transistor dimension downscaling.

Although strain in physics is a fundamental concept, however the source of strain in semiconductors and its effect on device performance is technology and structure-dependent. For example, strain in any device architecture can be generated by using thin film deposition [15], growing lattice mismatched hetero-structures [16] or by externally applied stress [17]. In semiconductor Field Effect Transistor devices, strain as a performance improvement tool in MOSFET structure was discovered in

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CHAPTER 9
Unmasking Nature's Fury: A Tale of Climate Change and Flash Floods in Uttarakhand India

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Abstract:

This study delves into the intricate dynamics of flash floods, focusing on the Himalayan region, particularly Uttarakhand, India. By examining the Kedarnath Flash Flood in 2013 and the Joshimath Flash Flood in 2021, the research explores the multifaceted causes and effects of these calamities, attributing them to climate change-induced glacial retreat and the formation of hazardous glacial lakes. The paper emphasizes the role of climate change in exacerbaing flash floods, specifically its impact on Himalayan glaciers, and advocates for a robust approach to disaster management in Uttarakhand. Pre-disaster measures, such as weather monitoring, public awareness, and resilient infrastructure planning, are highlighted, along with post-disaster strategies like effective rescue operations and medical facilities. Visual representations of affected areas through maps aid in understanding and planning mitigation efforts. The study underscores the importance of heightened awareness, improved infrastructure, and comprehensive disaster management planning to build resilience in flash flood-prone regions.

Keywords: Climate Change, Disaster Management, Flash floods.

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Socio-Economic Conditions of Street Children: A Case Study In India

Dr. Gourab Bera

Introduction

The term "street children" refers to children for whom the street is more than their family. It includes children who might not necessarily be homeless but who live in situations where there is no protection and no guidance from responsible adults. 'Street children' is a term used to refer to children who live on the streets. They are deprived of family care and protection. Most children on the streets are between the ages of about 5 and 18 years. According to J.M Swart, "a street child is any girl or boy who has not reached adulthood for whom the street has become her or his source of livelihood and who is inadequately protected and supervised." They live in abandoned buildings, parks and on the street itself. To study the meaning of a street child, a brief comparison between street children of the third and first world countries is very important. The street children of first world countries tend to be over the age of sixteen and only stay on the streets for a few months before returning home. Street children of third world nations are much younger than sixteen and stay on the streets for up to several years.

Categories of Street Children

UNICEF (2012) defines street children "as anyone under the age of 18 who either lives or works on the street". According to this definition, there are 3 types of street children-

- Street Living Children: These are children who live alone on the street, public spaces or night shelters. They may have run away from their family and have no responsible adult to look after them.
- Street Working Children: These are children who spend a majority of their time working on the streets or in public spaces but return either daily or occasionally to their families.

Human Rights: Challenges and Prevention

Dr. Rina Kar (Dutta)

What is Human Right?

Human Rights are the basic rights which exist inherently as a basic character of human being. These are the basic universal rights and freedom that a person enjoys. In this context Robert Niven in his book *Principles of Political Science* says: "Rights arise from the fact that man is a social being."[1] These rights are not imposed by any country or government; rather they are applicable to all human beings in spite of their race, religion, colour, sex, nationality or any other status. Human Rights are norms or standards that protect the dignity of all human being. It is considered to be a fundamental right because being a human being he is entitled to enjoy this right from his birth.

The concept of Human Right is not a new concept. It is as old as human civilization. In our ancient societies we found these rights, but not in such extended way. These Rights are deeply rooted in our past, they are entangled with our life. We are equally entitled to human rights without discrimination. The concept is deeply rooted in our earlier tradition and cultures over centuries and the root lies on the womb of human dignity. First implication of human rights has been seen in in early 539 BC. Cyrus the great, the first king of Persia, conquered Babylon and freed all, declared that all people had the right to choose their own religion and lived with their own dictum. These and other pronouncements had been written on black clay cylinder in their own Akkadian language. The scripts were known as cuneiform. This is famous for its unique preservation policy where all decrees are recorded. It portrays his liberal attitude towards tolerance to its core. We are cherishing till today his modern thinking of ruling a kingdom. The idea of Human Rights was spread very fast from Babylon to India, China and Rome. People tended to follow some unwritten law in their life and eventually natural laws arose. European political thought has been developed in full-fledged theoretical form with a modern perspective in the seventeenth-eighteenth century. As a result of the natural- rights

Gandhi's Views on Ahimsa: A Brief Note

Dr. Saswati De Mondal

Introduction

For Gandhi, Truth is the highest goal, so much so that 'Truth is God' and the means to attain this goal is *Ahimsā* or non-violence. For him, '*Ahimsā* and Truth are so intertwined that it is practically impossible to disentangle and separate them'. They are like the two sides of a smooth metallic disc where it is not possible to say, 'which is the obverse, and which is the reverse?'

Gandhi believed that non-violence is the greatest force man has been endowed with and when it becomes all-embracing it can transform everything it touches, because it includes the 'largest love' and 'largest charity'. For him the concept of non-violence was multidimensional, because it involved not only the act of abstaining from physical injury to other beings but also the attitude of patience and perseverance and willingness to forgive the misdeeds of those who offended him. This vision is nurtured in the belief of fundamental unity of the universe and that all living beings are the children of one creator having the same divine power within them.

Non-violence is essentially connected with another Gandhian notion of *Satyāgraha,* which signifies the pursuit of Truth, or sticking to the path of Truth.

His use of the concept of non-violence as a weapon in the struggle for India's independence movement marks the element of self-sacrifice and self-restraint but can also substantiate the aim to create a harmonious and egalitarian society.

Mahatma Gandhi developed his philosophical outlook not based primarily on training in academic philosophy, but on his experiments after experiments on moral, religious and existential issues, both in his inner life and in external reality. As a result, we find certain unique views regarding such issues that are still celebrated and treated respectfully all over the world.

Gandhi's openness to a wide range of religious and philosophical traditions is well known.

Religious Philosophy of Rabindranath Tagore and Mahatma Gandhi: A Comparative Study

Doly Show

Introduction

Rabindranath Tagore (1861-1941) is a prominent figure in the philosophical world. He was a key figure of the Bengali Renaissance. He was also a humanist, Universalist, and strident anti-nationalist who received the Nobel Prize in 1913. His philosophical works mainly focus on religious and ethical aspects. Because of his multi-faceted personality, Sisir Kumar Ghose eulogized him as "complete man".[1] Niharanjan Ray while writing about Tagore's encyclopaedic mind, rightly described him as a reconciler of indigenous and foreign traditions and "the Leonardo-da-vinci of the Indian renaissance."[2] He always spoke and stood in favour of individual freedom and social justice. He was a person who embodied love and humanitarianism. Gitanjali (1912), Sadhana (1913), The Religion of Man (1931), Creative Unity (1922), etc. are some of the significant writings of Tagore delineating his religious philosophy. Tagore's poetic foundation is intimately connected to his notion of the harmony between individual and universal thoughts which is also the bedrock of Indian tradition. By religion we usually believe in a particular path. Some time it is said that Religion is the language of the mind and the heart, contemplation and acceleration of excellence and ascent. But according to Rabindranath Tagore, Religion is more than that. For him it is self realization and, for that end-in-view, perennial and unending endeavour for the best and most illuminated efflorescence of the innermost one, the all serene, who always pervades anywhere and everywhere. In India the different schools of thought have originated from various religious movements, reform movements, and philosophical thoughts. It is also home to many other religions which now flourish outside the country. From different standpoints different thinkers have discussed religion differently. Here I shall discuss his religious thinking and its relevance in the modern age.

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The Transformation of Love at the Age of Reflexive Modernity

Soumen Das

British sociologist *Anthony Giddens* (1990) has described the modern world as a 'juggernaut'. The image of a juggernaut is of something that is moving along through time and over physical space (Ritzer; 2003: 545). He has used this term to describe an advanced stage of modernity – high, radical, or late-modernity. For Giddens (1991:16), modernity in the form of a juggernaut is extremely dynamic – a "runway world" with great increases in the space, scope, and profoundness of change over prior systems. These profound changes also include love and intimate relationships. According to Giddens, modernity is given dynamism by three essential aspects: distanciation, disembedding and reflexivity (Ritzer; 2003: 546). *Distanciation* is a process of increasing separation between time and space. Although this process of separation is, however, not unilinear but dialectical. Time was always linked with space in premodern societies. However, with the advent of modernization, time has been standardized (technology played a significant role) and the close linkage between time and space has been torn apart. Therefore, social interactions do not necessarily have to take place in the same time and place. This distanciation of time and space is the prerequisite for the second source of dynamism in modernity – *disembedding* (ibid). Disembedding involves "the 'lifting out' of social relations from local contexts of interaction and their restructuring across in definite spans of time-space" (1990: 21). There are two types of disembedding – symbolic tokens and systems of experts. The best symbolic token in modern world is money. It allows us to engage in transactions with others who are separated from us by time and / or space. The second expert system may be defined as "systems of technical accomplishment or professional expertise that organise large areas of the material and social environments in which we live today" (Giddens; 1990: 27). *Reflexivity* is the third characteristic of modernity. It is a defining characteristic of all human action. In premodern societies reflexivity was largely limited to the reinterpretation and clarification of

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সুবোধ ঘোষের ‘একটি নমস্কারে’: দেশ, রাজনীতি ও প্রেম

উত্তীয় বসু

১৯৪৭ সালে প্রকাশিত হয়েছিল ‘একটি নমস্কারে’ উপন্যাসটি। উপন্যাসটি লেখা হয়েছিল প্রাক্-স্বাধীনতা পর্বের অস্থির রাজনৈতিক প্রেক্ষাপটে। ভারতবর্ষ তখন স্বাধীনতা-প্রাপ্তির দোরগোড়ায়। । সুবোধ ঘোষ বিশ্বাস করতেন, ভারতের স্বাধীনতা আন্দোলনের মূল দুটি ধারা অহিংস ও সহিংস পথের মধ্যে মহাত্মা গান্ধীর অহিংস পথটিই শ্রেয়। গান্ধীর নেতৃত্বে অহিংস আন্দোলন যে কীভাবে দেশের প্রত্যন্ত অঞ্চলের মানুষকেও স্বাধীনতাসংগ্রামে উদ্বুদ্ধ করেছিল, তা-ই লেখক এই উপন্যাসে ফুটিয়ে তোলার চেষ্টা করেছেন। এই উপন্যাসে ‘ভারত ছাড়ো’ আন্দোলনের পটভূমিকায় রাজনীতি-আশ্রিত এক প্রেমের কাহিনিও বুনেছেন সুবোধ ঘোষ।’ ৪২-এর ভারত ছাড়ো আন্দোলনের প্রবাহের পাশাপাশি বয়ে চলেছে প্রেমের ধারা; একটি অন্যটিকে পরিপুষ্ট করেছে, সংঘাতের সৃষ্টি করেনি। প্রেম এসেছে জাতিভেদ এবং অস্পৃশ্যতার বিরুদ্ধে আত্মশুদ্ধি ঘটিয়ে। সেই সঙ্গে স্বাধীনতার লড়াই, জাতীয়তাবাদী রাজনীতির নানা দিক এবং বিভিন্ন ধরনের সামাজিক কুপ্রথার সঙ্গেও এ-উপন্যাসে পাঠকের পরিচয় ঘটেছে।

এই উপন্যাসের কেন্দ্রীয় চরিত্র সোমা রায়। সে পিতৃহীন। বিধবা মা এবং অনেক ছোটো দুই যমজ বোন চুনি-পান্নাকে নিয়ে তার সংগ্রামী জীবন। কোলকাতার চক্রবেড়িয়ায় তাদের একঘরের বাসা। একটি যুদ্ধমার্কা স্টোরের অফিসে সোমা চাকরি করত। সেখানে তার সম্ভ্রম বিপন্ন হওয়ায় সে চাকরি ছাড়তে বাধ্য হয়। সোমার মেজকাকা হাজিপুরের কন্ট্রাক্টর। তিনি আগে সোমাদের মাসিক চল্লিশ টাকার মানি অর্ডার পাঠাতেন। এখন তাঁর পাঠানো টাকার পরিমাণ ক্রমে কমে আসছে। যুদ্ধের বাজারে হঠাৎ বড়লোক হয়ে তিনি বদলে গেছেন।

স্টোরের অফিসের কাজ ছেড়ে সোমা কোলকাতাতে একটা স্বদেশী চাকরির জন্য চেষ্টা করেছিল। স্বদেশী চাকরি অর্থাৎ যে-চাকরিতে দেশসেবা ও বেতন দুই-ই আছে। সে চেষ্টা অবশ্য সফল হয়নি। শেষ পর্যন্ত সোমাকে একটি চাকরি যোগাড় ক’রে দেন তার বন্ধু ভদ্রার বাবা হিতেনবাবু। তিনি ব্যবসা ক’রেও ঠিক ব্যবসায়ী হতে পারেননি। ব্যবসা তাঁর ধর্ম হয়ে উঠতে পারেনি, শখ হয়েই থেকে গেছে। স্বদেশিয়ানাও তাঁর একটা শখ। সদানন্দময় এই মানুষটি স্বদেশী কর্মে হামেশাই জড়িয়ে পড়েন। তাঁর সুনির্দিষ্ট কোনো মতাদর্শ নেই। তিনি একই সঙ্গে দুই প্রতিদ্বন্দ্বী সংগঠন জনসেবা কমিটি এবং অল বেঙ্গল রিলিফ-এ আছেন। এজন্য তাঁকে নিয়ে কারো অবশ্য কোনো সমস্যা নেই। হিতেনবাবুও এতেই স্বচ্ছন্দ–

> *‘কোন কমিটিতে, কোন পার্টিতে ও কোন সঙ্ঘে তাঁর উচ্চাসন অবশ্য নেই। সবার মধ্যে একটা স্থান পেলেই তিনি ধন্য। তাঁর মতবাদ কি, এই প্রশ্নও বড়*

Biomimicry: Inspiring Innovation Through Reflecting on Nature's Designs

Dr. Moon Jana

Introduction

In an era marked by unprecedented environmental challenges and the pressing need for sustainable solutions, scientists, engineers, and innovators are turning to an age-old teacher for inspiration: nature. Biomimicry, the art of emulating nature's time-tested strategies and designs, has emerged as a powerful tool for sustainable innovation. Biomimicry, often known as nature-inspired design, constitutes a versatile approach that takes inspiration from nature's well-established solutions in order to tackle intricate human problems. This pioneering field encompasses the examination of biological systems, processes, and organisms to acquire insights that can be harnessed for human-created designs, technologies, and systems. Nature, through countless millennia of evolution, has forged impressive adaptations and sustainable resolutions for a wide array of dilemmas, ranging from the efficient conversion of energy during photosynthesis to the aerodynamic configurations observed in bird feathers. By replicating these biological techniques, biomimicry holds the potential to offer more sustainable, efficient, and robust solutions in diverse domains, including architecture, engineering, materials science, and medicine (Benyus). This approach not only fosters a deeper comprehension of our natural environment but also possesses the capacity to spur innovation and confront urgent environmental and technological challenges.

Biomimicry Nature's Blueprints for Innovation

Leonardo da Vinci emerges as a pivotal figure in the genesis of biomimicry. His multidisciplinary prowess, encompassing both the realms of arts and sciences, provided him with a unique

Technology and the Gender Gap: An Overview

Dr. Priyanka Roy

1. Introduction

Growing technology is one of the key elements assisting in narrowing the gender gap in society. This strategy seeks ideas and procedures to compensate women's societal disadvantages. The digital transition opens up new avenues for women's economic emancipation. It is a once-in-a-lifetime chance to broaden the scope of a flexible work environment for both men and women. Human desire to learn and evolve has been both a catalyst and a challenge. This holds true for the development of education as well. Education, the most valuable and productive human activity, is also greatly influenced by the power of technology. The pandemic has opened new threats as well as opportunities for humans. During the lockdown, online education continued, despite the closure of educational institutions. There is enough evidence to show that future working women must adapt to the changes due to digital transformation. The new generation of women cannot deny that they must embrace the digital world if they want to stay relevant in the ever-emerging digital age.

Internet in India

India is one of the countries that has witnessed rapid technological advancement. This has been accomplished through a combination of government action, commercial innovation and investment, and new digital applications that are altering and penetrating a wide range of activities and types of work, with an influence seen in all aspects of people's lives. As of February 2023, there are roughly 692 million active users in the nation's digital population. At this point, mobile internet users accounted for a considerable portion of the traffic in the second-largest internet market in the world. According to a joint report by IAMAI and Kantar 2022, the number of active internet users in 2018 was around 430 million. By 2025, it is

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Artificial Intelligence & Machine Learning Advancements, Applications, & Ethical Considerations

Tripurari Baksi

Introduction

Artificial Intelligence (AI) and Machine Learning (ML) stand as the cornerstones of 21st-century technological evolution, captivating the minds of scientists, engineers, and innovators while permeating diverse industries, transforming our daily lives in unprecedented ways. The symbiotic relationship between AI and ML unfolds as a narrative of remarkable advancements, technological intricacies, and ethical considerations.

AI, fundamentally, seeks to replicate human intelligence in machines, endowing them with capabilities like learning, reasoning, problem-solving, and decision-making. In tandem, Machine Learning, a subset of AI, specializes in crafting algorithms that enable systems to learn and enhance performance autonomously through data analysis.

The accelerated progression of AI, particularly in recent years, owes much to breakthroughs in deep learning, notably the prowess of neural networks. Modeled after the human brain, neural networks empower machines to process vast datasets, recognize patterns, and make predictions with unprecedented precision.

This rapid evolution manifests in significant achievements across various AI domains. Natural Language Processing (NLP) has empowered machines to comprehend and generate human language, ushering chat bots and virtual assistants into our daily lives. Computer Vision, another domain, enables machines to interpret visual information, fostering advancements like facial recognition and autonomous vehicles. Reinforcement Learning, characterized by

Rational Values of Neutrality and Objectivity and the Extension of the Reign of Science: 'Scientism' and Anti-Science

Dr. Chandrima Bhar

Till the first-half of the twentieth century the philosophy of science, that exerted its influence on the studies of science, conceived the excellence of science to consist in its 'value-free' character. Such a philosophy of science that dwells on a sharp distinction between fact and value and attains the most articulate shape with the logical positivists following the Vienna Circle's rigorous attempt to uphold the rationality in science, only carries out "...the legacy of three centuries of largely empiricist reflection on the "new" sciences ushered in by Galileo and his successors."[1] The irreducible distinction between fact and value is highlighted by the logical positivists who argue that science deals with facts alone. The fact/value distinction stands parallel to the objective/subjective distinction—facts are conceived to be objective as constituents of our knowledge of the world and opposed to values as subjective that reflect human interest through individual feelings and desires. Though science is often claimed to be devoid of any element of value, where value is taken in its subjective nature, another and quite different sense of 'value' that decides the worth of anything refers to certain objective character of the thing. Anything, in the latter sense of value, is valuable as it is found to be objectively desirable for an entity of a specific kind. In this sense we speak of value as quantified and mathematically or physically measurable. However, the application of science for human utility involves the element of values in science. The question of the benefits from scientific knowledge stands as a justification for limitless extension to the spheres kept outside of science and often branded as anti-science or pseudo-science. The self-proclamation of an all-pervasive character by science

1. McMullin, Eran, (2001), "Values in Science", in W.H. Newton-Smith ed., *A Companion to the Philosophy of Science*, Blackwell Publishers Ltd., p. 550.

MASTERING CONTENT WRITING

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Introduction:

One of the ways to communicate with other people is the written medium. Whether it is to express feelings or to convey information, written text is very important. Written text used to mean only printed media such as books, newspapers, periodicals, leaflets or booklets used in advertising campaigns. In the age of electronic media, written content becomes the basis of news, propaganda, advertisement or entertainment. Audio and visual sequences revolved around him on radio and television. The audibility and visibility of the subject takes the place of the text. A big change in this mass media can be observed after the internet. The written medium returns in a new form. Newspapers published their electronic version (e-version), common people started writing blogs to express their opinions, social media gave a new direction in interaction. Using this new medium, various commercial organizations are constantly presenting new topics on blogs, Facebook pages or websites for their promotion, advertising or public relations. Not only presenting, but also constantly researching how to make written text attractive to internet users, through catchy headlines, images, topic selection by brain mapping, etc. Currently, various political parties have also started the process

CRAFTING CLARITY: CAREER IN COPY EDITING AND PROOF READING

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1.1. Copyediting: Meaning and Nature

Copyediting is the revision of materials written by others to increase their suitability for publication or distribution. It involves correcting grammar, spelling, punctuation, and formatting errors, ensuring consistency in style, tone, and language usage. Copyeditors also suggest improvements to enhance clarity, coherence, and readability. Ultimately, the goal of copyediting is to polish the manuscript and ensure it meets the standards and expectations of the intended audience. Copyediting is an essential step in the publishing process, as it helps to refine and enhance the quality of the written material. Copyeditors have a good command over the language, and their expertise in language usage contributes to the text's readability, making it more accessible and engaging for readers. Their efforts elevate the manuscript to its highest potential, making it ready for publication or distribution. As Judith Butcher opines in her book:

> The main aims of copy-editing are to remove any obstacles between the reader and what the author wants to convey and to find and solve any problems before the book goes to the typesetter, so that production can go ahead without interruption or unnecessary expense. You might think that there is less need for copy-editing now that authors can use computer software to check spelling

CAREER IN HUMAN RIGHTS ADVOCACY

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Introduction

Human Rights are inherent rights that we enjoy as human beings. These rights are universal and granted to us simply because we exist as human beings. Human rights are rights we have simply because we exist as human beings - they are not granted by any state. These universal rights are inherent to us all, regardless of nationality, sex, national or ethnic origin, color, religion, language, or any other status. They range from the most fundamental - the right to life - to those that make life worth living, such as the rights to food, education, work, health, and liberty.

Human Rights Advocacy

Human rights advocacy deals with the preservation and implementation of Human Rights. A career in human rights advocacy basically means identifying and documenting human rights violation and propose remedies. A fundamental and steadfast commitment to advancing, defending, and upholding each person's inherent equality and dignity is human rights advocacy. It is a group effort founded on the idea that every person, regardless of history, identity, or situation, has a fundamental right to certain freedoms. Through advocacy, we work to establish a society devoid of prejudice, injustice, and violence, one in which everyone can live in harmony with

ECONOMIC AND SOCIAL GOVERNANCE AND SUSTAINABILITY CAREERS

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Introduction

It has been elaborately researched and acknowledged that the ruthless industrialization and unplanned capitalism have caused irreversible damage to environment in terms of harmful emissions, and hence are highly unsustainable. This is posing a threat to every stake holder of society. In contemporary world, business corporations have faced unparalleled risk due to the on-going climate change and its multi-layered environmental impact, their relentless and unplanned use of water and varied natural resources, how they treat their workers of both the genders throughout their organisation, and the safety, security, and usefulness of their products. The business community has come to a realisation that growth cannot be merely in terms of financial growth. One must take into consideration the needs of the future generation and develop a sustainable approach. The concept of sustainable business/conscious capitalism originates from sustainable development, an idea which was popularized by Brundtland Report (1987) of the World Commission on Environment and Development (WCED), United Nations (UN) and Agenda 21 (1992). Sustainable development has been defined in various literature as the mindful and holistic development process where the needs and aspirations of future generations are kept in consideration while meeting the demands of the present

COUNSELLING IN SCHOOLS, NGOs & OTHER ORGANIZATIONS

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The term 'counselling' includes work with individuals and with relationships which may be developmental, crisis support, psychotherapeutic, guiding or problem solving. The task of counselling is to give the 'client' an opportunity to explore, discover and clarify ways of living more satisfyingly and resourcefully" (BACP, 1984).

"Counselling denotes a professional relationship between a trained counsellor and a client. This relationship is usually person-to-person, although it may sometimes involve more than two people. It is designed to help clients to understand and clarify their views of their life space, and to learn to reach their self-determined goals through meaningful, well-informed choices and through resolution of problems of an emotional or interpersonal nature" (Burks and Stefflre, 1979).

Counselling is "a principled relationship characterized by the application of one or more psychological theories and a recognized set of communication skills, modified by experience, intuition and other interpersonal factors, to clients' intimate concerns, problems or aspirations. Its predominant ethos is one of facilitation rather than of advice-giving or coercion. It may be of very brief or long duration, take place in an organisational or private practice setting and may or may not overlap with practical, medical and other matters of personal welfare. It is both a distinctive activity undertaken by people

TRAVEL AND TOURISM AS CAREER

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"I cannot do everything, but I can do something. I must not fail to do the something that I can do." Helen Keller

To know what 'I can do' is the most important thing to figure out. You are at an important juncture of your career where you have already chosen the discipline for your degree course. You made the choice amongst many other courses based on a number of factors. Similarly while making a choice of a certificate course your main focus would remain on the career opportunities provided by the course and that is conducive for you.

Why travel and tourism could be the right choice for you?

UNWTO defined tourism as 'the activities of persons travelling to and staying in a place outside their usual environment for not more than one consecutive year for leisure, business and other purpose.'[1]

One has to keep in mind different approaches to study tourism like

Institutional approach: This is mainly the study of institutions involved in tourism activities. In this case it requires the investigation of the operating organisations .

Product approach: This is the most time consuming activity as it involves the thorough research of tourism products and how that has been produced.

[1] *Ann Rowe, John D. Smith and Fiona Borein, 'Travel and Tourism: Standard Level'. Cambridge University Press,.2002 p.1.*

STUDYING PHILOSOPHY: CAREER OPPORTUNITIES

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Introduction

Philosophy as an academic discipline is understood in different ways in different times, but for the present purpose it may be stated as the study of fundamental nature of reality, existence, and knowledge. Studying philosophy is an endeavour to answer to some of our most existential questions revolving around right and wrong, truth and falsehood, the meaning of life, the nature of human beings and the reality in which we live. This idea is reflected in the formulation of Cambridge Dictionary in answering the question as to what philosophy does in the following manner: "Philosophy makes 'use of reason in understanding such things as the nature of the real world and existence, the use and limits of knowledge, and the principles of moral judgements."

Why Philosophy?

It is an era when our intellectual life is quickened and enlarged by the disintegration of the traditional customs and beliefs, our moral life is threatened and in question. Everything seems to be experimental, although very few of our objectives are really established. The complexity and the rate of change in the present time is unprecedented. Most forms of life are altered – from the tools that complicate our toil to the wheels that whirls us restlessly about the earth. One escape worthy of a matured mind

CAREER PROGRESSION FOR A PHYSICS UNDERGRADUATE

Dr. Amit Kumar Bhattacharjee

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Your Future in Physical Science

Where do you think your career will embark after a decade has passed since now? Would it be a National or an International Laboratory, Institute of Eminence or good-old University, where you will be leading a group of youngsters as a Principal Investigator (PI), or creating computer models with the same computational skills you had learned in the presently offered Skill-Enhancement-Course in the CBCS curriculum, as well as the Skill-Oriented-Certificate-Course on Scientific Writing using LaTeX for prediction of climate change in a Metrological office? It could be the automobile industry where you will be leading a bunch of engineers in quality control of an automated car, or a game studio (like Disney Pixar) where you will look for all the Physics applications of an upcoming animated movie. You could be spending your life as an Administrator in the Government sector, or as a Geological scientist researching soil or the surface of the sea in search of Oil & Gas, or you could end up teaching youngsters in a very different country, or what could be more, in the same city where you grew up. Isn't this exciting and thrilling to imagine yourself in such a position?

Change is the only constant in the life of a Physicist. When you chose Physics as a career, perhaps you had a visionary that in the long run you might be able to find a path through the subject while not much of Physics was open to you, you had been seeing

CAREER IN ECONOMICS AND STATISTICS

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Introduction

The word career is often used to refer to a profession, occupation, trade or vocation. A career could define what you do for a successful and comfortable living. Career also refers to the progress and activities you take throughout the working years of your life, especially with regard to your occupation. It comprises the different jobs you have held, titles you have earned and work you have accomplished over a long period of time. Career has connotations of economics as well as psychology. Career making needs efforts of education and skill formation. Education and skill formation needs perseverance, dedication, single goal mindedness and confidence. The world is competitive. There is scarcity of opportunity. Thus career is to be built through taking part in competition. There are demand and supply of jobs. The job seekers constitute the supply side and the prospective employers constitute the demand side. The buyers want to pay higher price for better quality product. Similarly, employers want to pay higher salaries and facilities for higher quality candidates. Thus, one has to acquire quality to get better jobs.

There are certain skills required to have a better career scope in

BIO-ENTREPRENEURSHIP: EMPLOYMENT, EMPOWERMENT, INNOVATION

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Bio-entrepreneurship, a combination of biology and entrepreneurship ecosystem is the use of biological sciences for business ideas. 'Bios' meaning life and 'logos' discourse or reason, bio-entrepreneurship targets innovations of use and benefit, besides creating a large job market (Patzelt and Brenner, 2008). It is especially for those who wish to venture into new entrepreneurial opportunities with products and services creating global market and impact (Kumari, 2021).

Business related to biosciences target to popularize bio products besides promoting research beneficial to mankind. Bio-entrepreneurship truly has the potential to create novel techniques for disease prevention, feeding the hungry, biofuel production etc.

Need:

1. Bio-entrepreneurship is now considered a lucrative career option in both scientific and business fields.
2. This particular career option provides a strong foundation for creating new business opportunities and development in marketing, project management, consulting experts in biotechnology, pharmaceuticals, medical technology in various research laboratories, patent offices, private science-based companies, public sector institutions as

DIGGING INTO THE PROSPECTS OF CLINICAL BIOCHEMISTRY

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Introduction

Clinical biochemistry defines the protocols and interpretation of *in vitro* biochemical tests done with physiological tissues and body fluids. Clinical Biochemistry involves two parts: analytical and interpretation, where the former determines the levels of chemical components in individuals while the latter involves the examination of the results (S Varcoe, 2001). This data helps in diagnosis, determination of prognosis, outline and study the effectiveness of treatment for the diseases (https://www.elgalabwater.com/clinical-biochemistry; accessed on 4th December, 2023). The clinical biochemistry originated in 19th century with simple chemical tests of urine and blood and gradually emerged as an interdisciplinary science involving chemistry, biology, medicine, biochemistry, biomedical engineering and bioinformatics. The private and hospital-attached pathological and diagnostic laboratories make the best use of clinical biochemistry. The basis of pathological tests involves the identification and quantification of biomarkers from individuals at per their clinical symptoms and history. Therefore, the tests include basic functional evaluation of concerned organs (liver, kidney, heart, lungs), identification of

ORNAMENTAL FISH BUSINESS

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Introduction:

Ornamental fish keeping and its propagation has been an interesting activity for many, which provide not only aesthetic pleasure but also belief to be financial openings. The growing interest in ornamental fishes has resulted in steady increase in its trade globally. The overall trade including non-exported products, wages and retail sales including accessories and fish feed is around US$ 15 billion. The global trade in exports of ornamental fishes has increased at an average of 14 percent per year since 1985 (FAO, 2013).The major ornamental fish producing countries are mostly from Asia and Europe. The top exporting countries during 2011 - 2012 was Singapore followed by Japan, Czech Republic, Thailand, Malaysia, Israel, Indonesia, Netherlands and Sri Lanka. The countries of Asian Sub-Continent contribute about 56% to global ornamental fish export. However, contribution of India in global trade remains below 1% (US$ 1.16 million) of the total. India has been exporting some unique varieties of wild caught ornamental fish to many developed countries of the world since 1969.

In India, about 80% of the ornamental fish come from fresh waters, but they are mostly exotic species. Among the fresh water fishes, 98% are cultured and only 2% are captured from wild. The captive breeding of ornamental fishes can open up new avenues and lead to the supply of hatchery bred young ones to the global markets throughout the year. Further, community based ornamental aquaculture has the effect of direct

AQUAPONICS: OPPORTUNITIES AND CHALLENGES

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Aquaponics is an integrated multi-trophic system that combines elements of recirculating aquaculture and hydroponics. Increasing concern about sustentation of environment as well as health hazards associated with agrochemicals and assure the consumer's engrossment to safe and hazard free food are the major factors that lead to the growing eagerness in different forms of agriculture in the world. Organic agriculture is one among the broad spectrum of production methods that are concerned to the environment . Aquaponics is a sustainable source of food in organic agriculture. Aquaponics mentions to any system that combines conventional aquaculture with hydroponics in a synergetic environment. Aquaponics farming is an incredibly prolific way to grow organic vegetables, greens, herbs and fruits without using any agrochemicals with the added benefit of fresh fish as a safe, healthy source of protein. It is a revolutionary technique for growing plants, where the aquaculture effluent is diverted through plant beds in a sustainable closed system. The fish and plants are reliant on the balance of dissolved nutrients and quality of the water, as they generate and utilize metabolic products from each other. Because of the symbiotic uptake and release of nutrients from fish to plants, periodic monitoring of aquaponics system water is essential . It requires sincere contribution of our valuable time and sufficient care. One of the shortcomings that encounters in aquaponics system is the exertion in maintaining optimal levels

A PATHFINDER FOR ASPIRANTS SEEKING CAREER IN WILDLIFE, FORESTRY AND ECOLOGICAL SCIENCE

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Career finding has been the quest of life at least from the formal education point of view. We train learners to build skills, identify scopes and compete for job positions based on their eligibility and likings. Choice-based education is slowly replacing the rather rigid streams to keep the balance between skill and passion. Today we will discuss the careers that function in safeguarding our natural history (biodiversity, ecosystem and their interrelationships) from academic, administrative and research space. To begin with, we must know who is ideal for such careers both from eligibility and mentality. Students with training in the basic science of any discipline can opt for such a profession (which we will elaborate on later in this article). Moreover, those who want to escape from the cacophony of cities, like Mother Nature more than a place to travel for a while. Someone who wants to spend more time to eventually contribute productively and with strong empathy for the diverse floral and faunal components, eager to solve complex issues linked to local and global species loss and landscape alteration and many more.

1.1 Common scopes to work on:

1. An aspirant should have training that provides a scientific understanding of natural processes, natural wealth (biodiversity and bioresource), interactions between

CAREER IN E-COMMERCE BUSINESS

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The e-commerce business industry is introducing the following rush of progress for the Indian economy and in the event that you've been contemplating wandering a foot into its universe of unending benefits, at that point the clock is ticking...the time is ready to begin your own e-commerce business in India.

Introduction:

Marketing is the process by which companies connect with customers, offer products of value, and build relationships with those customers so that they continue to buy as well as keep growing relationships. Marketing has several components, from branding and advertising, necessary sales care and contact. Digital marketing is not that different. It is the use of the Internet, mobile devices, social media, search engines, and other channels to reach consumers. And in present era, this situation is not so surprising.

However, some people might think that digital marketing only involves the internet, or that it's just about paid adverts on Google. Digital marketing does involve the internet, but it refers to marketing with the use of any electronic media. This could be through a potential consumer using a computer, mobile phone, television, or any combination of these. Now the easy access of internet and rise of popularity of smart phones today, it is natural

BANKING REDEFINED: UNVEILING EMERGING CAREER DIMENSIONS

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Banking isn't just about transactions; it's about transformation

Introduction:

he banking industry is undergoing a profound transformation, propelled by rapid technological advancements, changing consumer behaviours, and evolving regulatory landscapes. In this dynamic environment, traditional banking roles are expanding, and new dimensions of banking careers are emerging. These new dimensions offer exciting opportunities for professionals to explore innovative pathways, contribute to industry evolution, and meet the evolving needs of customers and stakeholders.

From digital banking and fintech innovations to sustainable finance and customer experience management, the banking sector is witnessing a diverse range of career dimensions that require specialized skills, knowledge, and expertise. Professionals who embrace these new dimensions are poised to navigate the complexities of the modern banking landscape, drive organizational growth, and shape the future of banking in profound ways.

CAREER IN THE CORPORATE WORLD

(Navigating the Corporate Cosmos - A Blueprint for Young Graduates)

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Embarking on the journey from academia to the corporate cosmos is akin to stepping into a thrilling adventure—an odyssey where the rules of engagement are fluid, the challenges are dynamic, and the opportunities are boundless. For young graduates, this transition marks the crossing of a threshold into a realm where theoretical knowledge meets the pulsating heartbeat of real-world work dynamics.

As you stand on the cusp of this exciting venture, armed with degrees, dreams, and the anticipation of professional possibilities, it's paramount to equip yourself with the navigational tools that will guide you through the intricacies of the corporate galaxy.

This chapter is your compass, your star chart, and your guide through the uncharted territories of the professional world. Our aim is not just to survive in the corporate cosmos but to thrive—to carve out a niche where your skills, passions, and aspirations align with the rhythms of the workplace.

In this odyssey, we will draw inspiration from the wisdom of thought leaders and visionaries who have left indelible marks on

AVENUES IN CORPORATE COMMUNICATION

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Introduction to Corporate Communication

Philip Kitchen and Don Schultz in "Raising the Corporate Umbrella" (2001, p.106) state, "Corporate communication at its simplest is primarily a mechanism for developing and managing a set of relationships with public or stakeholders who could affect the overall performances. These relationships must be viewed in a long-term strategic fashion." Thus, corporate communication is essentially communication between an organisation and its publics.

The popular HR platform Keka defines corporate communication as "an approach of organizational communication involving internal and external members that convey the corporate's identity. It includes all employees, managers, stakeholders, and investors who communicate the brand's message to the external market." Therefore, the publics of an organisation can be internal, such as its own employees, and external, such as customers. Corporate communication encompasses communication with both internal and external stakeholders or publics.

Scope of Career

The publics of an organisation include customers, employees, mass media, competitors, general public, shareholders, suppliers and contractors, investors, and statutory authorities.

DISASTER MANAGEMENT AS A CAREER

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In a world that is increasingly susceptible to a diverse range of disasters, ranging from natural calamities to human-made crises, the field of disaster management has emerged as a critical and dynamic career option. Disaster management professionals play a pivotal role in mitigating the impact of emergencies, coordinating effective responses, and aiding in the recovery and reconstruction of affected communities. As the frequency and severity of disasters continue to rise, the demand for skilled and dedicated individuals in the realm of disaster management has grown exponentially. This field not only offers an opportunity to make a tangible difference in the lives of those affected by crises but also presents a challenging and rewarding career path for individuals passionate about safeguarding communities and building resilience in the face of adversity. This introduction explores the multifaceted aspects of disaster management as a career, highlighting its significance, challenges, and the potential for positive impact on a global scale.

A disaster is a sudden, catastrophic event that causes significant disruption, destruction, and distress, often overwhelming the affected community's ability to cope with its impact. Disasters can be natural or human-made, and they come in various forms, each posing unique challenges for emergency response and recovery efforts. Here are some common types of disasters:

WILDLIFE MANAGEMENT : Principles and Practices

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1. Introduction:

1.1 Concept of 'Wild'

The term 'wildlife' generally revolves around the perspective i.e., big sized, glamorous and charismatic fauna (like tiger, lion, elephant, rhinoceros, deer, crocodiles, pythons, peafowls etc.) who live in forests, seas or in other large areas which are not inhabited by human. But on the contrary to this popular belief any plant or animal species inhabiting in any natural habitats (like forests, deserts, seas etc.) or in human habitats (like urban and rural areas) other than domesticated or pet ones (i.e., cultivated plants, cattle, goat, lamb, pig, chicken, ducks) are to be considered as 'wild'.

Wild animals or plants are those whose populations have emerged under natural evolutionary forces like natural selection or genetic drift, unlike domesticated ones who in contrast evolve by the force of artificial selections by humans. In simpler way, the wild animals are those animals whose survival does not depend upon humans and whose reproductions and growths are not controlled by humans.

So wildlife includes uncultivated plant species (ranging from small grasses to huge Banyan trees), small mammals (like jackals, fox, civets, porcupines, squirrels, rats, bats etc.), reptiles (like monitor lizards, different snakes, geckos etc.), birds

WRITING CV

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Introduction

Curriculum Vitae is abbreviated as CV. The phrase *Curriculum Vitae* is a Latin term which means 'course of life'. CV is the most important document when it comes to getting a job as a strong and well written CV can get you the call from the recruitment agencies. Well-presented CV also indicates how professional and organized one is. The main purpose of your CV is to reveal your accomplishments, qualifications and experiences to the hiring companies.

Some Tips for CV Writing

We all know that companies receive hundreds of CVs for each recruitment notification. Thus, it becomes difficult to prepare a well-presented CV which will catch the eyes of recruitment agencies. The following tips by K. Alex will make your CV stand out in the crowd:

1. Your contact information should be mentioned clearly at the top of your CV.

2. Begin with your most recent accomplishments.

UNVEILING THE POWER OF PSYCHOMETRICS AT WORKPLACE

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Introduction:

The Seeds of Measurement in Psychology

Psychometrics, in its essence, is the science of psychological measurement. It involves the design, administration, and interpretation of tests and assessments that quantify psychological attributes, such as intelligence, personality traits, and abilities.

The evolution of psychometric testing is deeply rooted in the quest to measure and understand the intricacies of the human mind. Its journey begins in the late 19th century when psychologists sought systematic ways to quantify mental abilities and behaviours.

Psychometric testing is now a well-engrained part of employee decision making within organisations. Assessment results are used to help evaluate suitability for hiring, determining match with organisational values and culture, examining best-fitting career options, building effective work teams, and ascertain potential for leadership (Bailey, 2017; Kantrowitz, Tuzinski and Raines, 2018). Standardised testing offers the potential for accuracy, validity and fairness. Through tests, detailed

APPLIED PROSPECTS OF BIO-SCIENCE STUDENTS IN INDUSTRIES

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As a bioscience student or graduate, one has already made some important decisions in life concerning his/her career. Think back, how you chose your degree course and university, for instance. Many courses were available to you, so how did you decide? Perhaps your choice was based on the course content, the geographical location of the university and its reputation. Or maybe your choice was linked to a particular career you are keen to pursue. Whatever influenced your decision, you are now faced with a new set of choices which will be based on a further set of factors. Your degree course and university experiences are likely to be factors which have a major influence over your next career step. These may include work experience you have gained during the course of your degree, your interests, skills and personality. In addition, other factors such as your personal situation, job market knowledge and understanding of good career planning will play a part.

Job seeking strategies

Looking for a job can be a daunting and time-consuming experience so it's important you remain focused and as organized as possible in your search. The way you conduct your job search will depend on the types of career you are considering, as different job sectors use different methods to recruit people. You may not have a clear idea about your career plans right now so researching various options and assessing

BONDING WITH BIOLOGY AND CHEMISTRY: A CAREER PERSPECTIVE

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The Interdisciplinary Nature of Biological Science

Biological science is the study of life and living organisms, from the molecular and cellular level to the ecological and evolutionary level. It encompasses a wide range of disciplines and also interacts with other fields of science, such as chemistry, physics, mathematics, computer science, engineering, and medicine, to address complex and challenging questions about life.

Biological science is interdisciplinary because life is complex and diverse, and cannot be fully understood by a single discipline or perspective. Biological phenomena often involve multiple levels of organization, multiple types of interactions, and multiple types of influences. For example, the function of a protein depends on its structure, which is determined by its sequence of amino acids, which is encoded by its gene, which is regulated by other genes and environmental factors, which are influenced by the evolutionary history and ecological context of the organism. To understand the function of a protein, one needs to integrate knowledge and methods from biochemistry, biophysics, genetics, molecular biology, physiology, and ecology (Figure-1) (Okamura, 2019).

Biological science is also interdisciplinary because it can benefit from the advances and innovations of other fields of science.

DIGITAL ENTREPRENEURSHIP:

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The term "Digital entrepreneurship" encapsulates the transformation of business in response to the ongoing evolution of business and society influenced by advanced technology. It underscores changes in entrepreneurial practices, theories, and education.

Digital entrepreneurship encompasses all aspects that are novel and distinctive about business in the digital realm, including:

- Innovative methods for discovering customers for creative endeavors.
- Fresh approaches to designing and offering products and services.
- New strategies for generating revenue and reducing costs.
- Opportunities to collaborate with platforms and partners.
- Novel sources of opportunity, chance, and competitive advantage.

On a practical level, digital entrepreneurship creates additional opportunities for aspiring entrepreneurs. While some opportunities may be more technical, many are accessible to anyone acquiring the fundamental skills of digital business, such as finding customers online, prototyping new business ideas, and refining concepts based on data.

Beyond acquiring practical skills, digital entrepreneurship prompts new ways of thinking about entrepreneurship itself,

EXPLORING CAREERS IN INDIA'S NON-GOVERNMENTAL SECTORS

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Introduction:

In the vibrant tapestry of India's diverse and dynamic workforce, the non-governmental sector stands as a powerful force for change and social impact. As the country undergoes rapid economic development and societal transformations, the demand for individuals committed to addressing pressing issues and contributing to sustainable development has never been greater. This introductory chapter embarks on a journey to explore the multifaceted realm of careers in India's non-governmental sectors, shedding light on the challenges, opportunities, and the profound impact that individuals can make in these spheres.

Scope of career:

India's potential for employment is vast, owing to its growing population, demographic dividend, and emerging sectors. Several industries such as information technology, healthcare, e-commerce, renewable energy, and manufacturing have witnessed considerable growth and have the potential to generate more jobs in the future. The government's focus on initiatives like, "Make in India" and "Digital India" further augments employment opportunities in manufacturing and technology sectors. Moreover, the rise of entrepreneurship and the start-up ecosystem in India have led to the creation of

DIVERSITY MANAGEMENT AT WORKPLACE

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In the dynamic tapestry of today's corporate landscape, the resonance of diversity echoes louder than ever before. Organizations, once monolithic entities, are now evolving ecosystems teeming with individuals from varied backgrounds, cultures, and perspectives. This metamorphosis has thrust Diversity Management into the forefront of strategic human resource practices, transforming it from a laudable initiative to an indispensable cornerstone for organizational success.

Imagine an orchestra where each instrument, distinct in its timbre and melody, contributes to the symphony's richness. Similarly, in the corporate realm, a harmonious interplay of diverse voices can create an organizational symphony that resonates innovation, creativity, and resilience. This chapter embarks on a journey through the labyrinth of Diversity Management, unraveling its significance, exploring how diversity can be a potent competitive advantage, and offering a compass for managers to navigate the path toward becoming diversity champions.

As organizations become microcosms of the globalized world, the need to foster inclusivity is not just an ethical imperative but an existential one. The competitive edge of a company is no longer solely determined by its products or services; it is shaped by the mosaic of talents, perspectives, and experiences that its workforce brings to the table.

KEY SKILLS OF MANAGEMENT INTERVIEW

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Introduction:

In the dynamic and competitive business landscape, effective management is essential for organizational success. Management roles require a unique set of skills that go beyond technical expertise, encompassing leadership, communication, and strategic thinking. Knowing the necessary skills is fundamental for individual success, organizational effectiveness, and career advancement. By understanding and cultivating the right skills, individuals can position themselves for success, contribute meaningfully to their organizations, and adapt to the evolving demands of the professional landscape. This chapter delves into the necessity of knowing key skills essential for management positions, offering insights into the scope of a management career, pin pointing the skills to be mastered.

Necessity of knowledge of the skills:

Knowing the necessary skills, especially in a specialized field like management, is crucial for several reasons:

Job Preparedness: Understanding the required skills ensures that individuals are adequately prepared for their roles. This preparation can lead to better job performance, increased job satisfaction, and a smoother transition into the professional environment.

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Electro-optic stabilization and control for a polymer stabilized ferroelectric liquid crystal FREE

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