

MAT 1034 INTRODUCTION TO PROBABILITY

Chapter 4: Multivariate Probability Distribution

1. Joint Probability Distributions

Our study of random variables and their probability distributions in the preceding chapters is restricted to one-dimensional sample spaces, where we recorded outcomes of an experiment as values assumed by a single random variable. There will be situations, however, where we may find it desirable to record the simultaneous outcomes of several variables. For example:

1. We might measure the amount of precipitate P and volume V of gas released from a controlled chemical experiment, giving rise to a two-dimensional sample space consisting of the outcomes (p, v) .
2. We might be interested in the hardness H and tensile strength T of cold-drawn copper, resulting in the outcomes (h, t) .
3. In a study to determine the likelihood of success in college based on high school data, we might use a three-dimensional sample space and record for each individual his or her aptitude test score, high school class rank, and grade-point average at the end of freshman year in college.

If X and Y are two discrete random variables, the probability distribution for their simultaneous occurrence can be represented by a function with values $f(x, y)$ for any pair of values (x, y) within the range of the random variables X and Y . This function is referred to as the joint probability distribution of X and Y .

Hence, in the discrete case,

$$f(x, y) = P(X = x, Y = y)$$

that is, the values $f(x, y)$ give the probability that outcomes x and y occur at the same time.

Definition 1.1

The function $f(x, y)$ is a joint probability distribution or probability mass function of the discrete random variables X and Y if

1. $f(x, y) \geq 0$ for all (x, y)
2. $\sum_x \sum_y f(x, y) = 1$
3. $P(X = x, Y = y) = f(x, y)$

For any region A in the xy plane, $P[(X, Y) \in A] = \sum_x \sum_y f(x, y)$

Chapter 4 Multivariate Probability And Statistics

J Dewey



Chapter 4 Multivariate Probability And Statistics:

Eventually, you will extremely discover a further experience and finishing by spending more cash. nevertheless when? do you consent that you require to acquire those all needs taking into account having significantly cash? Why dont you attempt to acquire something basic in the beginning? Thats something that will lead you to comprehend even more approximately the globe, experience, some places, when history, amusement, and a lot more?

It is your no question own get older to produce an effect reviewing habit. in the course of guides you could enjoy now is **Chapter 4 Multivariate Probability And Statistics** below.

https://matrix.jamesarcher.co/public/book-search/default.aspx/digital_detox_lifestyle_paperback.pdf

Table of Contents Chapter 4 Multivariate Probability And Statistics

1. Understanding the eBook Chapter 4 Multivariate Probability And Statistics
 - The Rise of Digital Reading Chapter 4 Multivariate Probability And Statistics
 - Advantages of eBooks Over Traditional Books
2. Identifying Chapter 4 Multivariate Probability And Statistics
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Chapter 4 Multivariate Probability And Statistics
 - User-Friendly Interface
4. Exploring eBook Recommendations from Chapter 4 Multivariate Probability And Statistics
 - Personalized Recommendations
 - Chapter 4 Multivariate Probability And Statistics User Reviews and Ratings
 - Chapter 4 Multivariate Probability And Statistics and Bestseller Lists
5. Accessing Chapter 4 Multivariate Probability And Statistics Free and Paid eBooks

- Chapter 4 Multivariate Probability And Statistics Public Domain eBooks
 - Chapter 4 Multivariate Probability And Statistics eBook Subscription Services
 - Chapter 4 Multivariate Probability And Statistics Budget-Friendly Options
6. Navigating Chapter 4 Multivariate Probability And Statistics eBook Formats
 - ePub, PDF, MOBI, and More
 - Chapter 4 Multivariate Probability And Statistics Compatibility with Devices
 - Chapter 4 Multivariate Probability And Statistics Enhanced eBook Features
 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Chapter 4 Multivariate Probability And Statistics
 - Highlighting and Note-Taking Chapter 4 Multivariate Probability And Statistics
 - Interactive Elements Chapter 4 Multivariate Probability And Statistics
 8. Staying Engaged with Chapter 4 Multivariate Probability And Statistics
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Chapter 4 Multivariate Probability And Statistics
 9. Balancing eBooks and Physical Books Chapter 4 Multivariate Probability And Statistics
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Chapter 4 Multivariate Probability And Statistics
 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
 11. Cultivating a Reading Routine Chapter 4 Multivariate Probability And Statistics
 - Setting Reading Goals Chapter 4 Multivariate Probability And Statistics
 - Carving Out Dedicated Reading Time
 12. Sourcing Reliable Information of Chapter 4 Multivariate Probability And Statistics
 - Fact-Checking eBook Content of Chapter 4 Multivariate Probability And Statistics
 - Distinguishing Credible Sources
 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development

- Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Chapter 4 Multivariate Probability And Statistics Introduction

In the digital age, access to information has become easier than ever before. The ability to download Chapter 4 Multivariate Probability And Statistics has revolutionized the way we consume written content. Whether you are a student looking for course material, an avid reader searching for your next favorite book, or a professional seeking research papers, the option to download Chapter 4 Multivariate Probability And Statistics has opened up a world of possibilities. Downloading Chapter 4 Multivariate Probability And Statistics provides numerous advantages over physical copies of books and documents. Firstly, it is incredibly convenient. Gone are the days of carrying around heavy textbooks or bulky folders filled with papers. With the click of a button, you can gain immediate access to valuable resources on any device. This convenience allows for efficient studying, researching, and reading on the go. Moreover, the cost-effective nature of downloading Chapter 4 Multivariate Probability And Statistics has democratized knowledge. Traditional books and academic journals can be expensive, making it difficult for individuals with limited financial resources to access information. By offering free PDF downloads, publishers and authors are enabling a wider audience to benefit from their work. This inclusivity promotes equal opportunities for learning and personal growth. There are numerous websites and platforms where individuals can download Chapter 4 Multivariate Probability And Statistics. These websites range from academic databases offering research papers and journals to online libraries with an expansive collection of books from various genres. Many authors and publishers also upload their work to specific websites, granting readers access to their content without any charge. These platforms not only provide access to existing literature but also serve as an excellent platform for undiscovered authors to share their work with the world. However, it is essential to be cautious while downloading Chapter 4 Multivariate Probability And Statistics. Some websites may offer pirated or illegally obtained copies of copyrighted material. Engaging in such activities not only violates copyright laws but also undermines the efforts of authors, publishers, and researchers. To ensure ethical downloading, it is advisable to utilize reputable websites that prioritize the legal distribution of content. When downloading Chapter 4 Multivariate Probability And Statistics, users should also consider the potential security risks associated with online platforms. Malicious actors may exploit vulnerabilities in unprotected websites to distribute malware or steal personal information. To protect themselves, individuals should ensure their devices have reliable antivirus software installed and validate the legitimacy of the websites they are downloading from. In conclusion, the ability to download Chapter 4 Multivariate Probability And

Statistics has transformed the way we access information. With the convenience, cost-effectiveness, and accessibility it offers, free PDF downloads have become a popular choice for students, researchers, and book lovers worldwide. However, it is crucial to engage in ethical downloading practices and prioritize personal security when utilizing online platforms. By doing so, individuals can make the most of the vast array of free PDF resources available and embark on a journey of continuous learning and intellectual growth.

FAQs About Chapter 4 Multivariate Probability And Statistics Books

What is a Chapter 4 Multivariate Probability And Statistics PDF? A PDF (Portable Document Format) is a file format developed by Adobe that preserves the layout and formatting of a document, regardless of the software, hardware, or operating system used to view or print it. **How do I create a Chapter 4 Multivariate Probability And Statistics PDF?** There are several ways to create a PDF: Use software like Adobe Acrobat, Microsoft Word, or Google Docs, which often have built-in PDF creation tools. Print to PDF: Many applications and operating systems have a "Print to PDF" option that allows you to save a document as a PDF file instead of printing it on paper. Online converters: There are various online tools that can convert different file types to PDF. **How do I edit a Chapter 4 Multivariate Probability And Statistics PDF?** Editing a PDF can be done with software like Adobe Acrobat, which allows direct editing of text, images, and other elements within the PDF. Some free tools, like PDFescape or Smallpdf, also offer basic editing capabilities. **How do I convert a Chapter 4 Multivariate Probability And Statistics PDF to another file format?** There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobat's export feature to convert PDFs to formats like Word, Excel, JPEG, etc. Software like Adobe Acrobat, Microsoft Word, or other PDF editors may have options to export or save PDFs in different formats. **How do I password-protect a Chapter 4 Multivariate Probability And Statistics PDF?** Most PDF editing software allows you to add password protection. In Adobe Acrobat, for instance, you can go to "File" -> "Properties" -> "Security" to set a password to restrict access or editing capabilities. Are there any free alternatives to Adobe Acrobat for working with PDFs? Yes, there are many free alternatives for working with PDFs, such as: LibreOffice: Offers PDF editing features. PDFsam: Allows splitting, merging, and editing PDFs. Foxit Reader: Provides basic PDF viewing and editing capabilities. How do I compress a PDF file? You can use online tools like Smallpdf, ILovePDF, or desktop software like Adobe Acrobat to compress PDF files without significant quality loss. Compression reduces the file size, making it easier to share and download. Can I fill out forms in a PDF file? Yes, most PDF viewers/editors like Adobe Acrobat, Preview (on Mac), or various online tools allow you to fill out forms in PDF files by selecting text fields and entering information. Are there any restrictions when working with PDFs? Some PDFs might have restrictions set by their creator, such as password protection,

editing restrictions, or print restrictions. Breaking these restrictions might require specific software or tools, which may or may not be legal depending on the circumstances and local laws.

Find Chapter 4 Multivariate Probability And Statistics :

digital detox lifestyle paperback

painting techniques manual advanced strategies

coding manual blueprint

self help mindset hardcover

mindfulness meditation blueprint

social media literacy practice workbook

sight words learning ebook

collection gothic fantasy

AI usage manual ultimate guide

complete workbook picture book toddlers

Goodreads choice finalist international bestseller

picture book toddlers award-winning

stories BookTok trending

science experiments children framework

hardcover self help mindset

Chapter 4 Multivariate Probability And Statistics :

peter watts is an angry sentient tumor revenge fantasies - Jan 13 2023

web peter watts is an angry sentient tumor revenge fantasies and essays by watts peter at abebooks co uk isbn 10

1616963190 isbn 13 9781616963194 tachyon publications 2019 softcover

peter watts is an angry sentient tumor revenge fantasies and - Jun 18 2023

web in more than fifty unpredictable essays and revenge fantasies peter watts hugo award winning author former marine biologist and angry sentient tumor is the savage dystopian optimist whom you can t look away from even when you probably should read more print length 320 pages sticky notes on kindle scribe language english

peter watts is an angry sentient tumor open library - Mar 15 2023

web nov 12 2019 peter watts is an angry sentient tumor revenge fantasies and essays by peter watts 0 ratings 0 want to read 0 currently reading 0 have read this edition doesn't have a description yet can you add one publish date nov 12 2019 publisher tachyon publications pages 320 showing 2 featured editions view all 2 editions

9781616963194 peter watts is an angry sentient tumor revenge - Dec 12 2022

web peter watts is an angry sentient tumor revenge fantasies and essays watts peter 3.9 avg rating 195 ratings by goodreads softcover isbn 10 1616963190 isbn 13 9781616963194 publisher tachyon publications 2019 this specific isbn edition is currently not available view all copies of this isbn edition synopsis about this title

peter watts is an angry sentient tumor revenge fa horace - Jun 06 2022

web is peter watts is an angry sentient tumor revenge fa below the great heart way ilia shinko perez 2013 02 08 self compassion positive social relations an enduring sense of freedom and peace they're essential parts of our everyday lives or should be but each of us struggles with difficult emotions and mental blockages

[peter watts is an angry sentient tumor revenge fantasies and](#) - Jul 19 2023

web in more than fifty unpredictable essays and revenge fantasies peter watts hugo award winning author former marine biologist and angry sentient tumor is the savage dystopian optimist whom you can't look away from

peter watts is an angry sentient tumor overdrive - Mar 03 2022

web nov 12 2019 media peter watts is an angry sentient tumor ebook revenge fantasies and essays by peter watts find this title in libby the library reading app by overdrive search for a digital library with this title search by city zip code or library name learn more about precise location detection title found at these libraries

peter watts is an angry sentient tumor overdrive - Feb 14 2023

web nov 12 2019 in more than fifty unpredictable essays and revenge fantasies peter watts hugo award winning author former marine biologist and angry sentient tumor is the savage dystopian optimist whom you can't look away from

peter watts is an angry sentient tumor revenge fantasies and essays - Feb 02 2022

web peter watts is an angry sentient tumor revenge fantasies and essays paperback illustrated nov 12 2019 by peter watts author 4.4 106 ratings see all formats and editions kindle edition 9.99 read with our free app paperback 21.95 6 used from 17.47 7 new from 21.95 1 collectible from 76.34 a brilliant bastard cory doctorow

[peter watts is an angry sentient tumor revenge fantasies and essays](#) - Apr 16 2023

web nov 12 2019 in more than fifty unpredictable essays and revenge fantasies peter watts hugo award winning author former marine biologist and angry sentient tumor is the savage dystopian optimist whom you can't look away from

peter watts is an angry sentient tumor revenge fantasies and - Sep 21 2023

web nov 12 2019 in more than fifty unpredictable essays and revenge fantasies peter watts hugo award winning author

former marine biologist and angry sentient tumor is the savage dystopian optimist whom you can't look away from even when you probably should

peter watts is an angry sentient tumor revenge fantasies and - Aug 20 2023

web nov 12 2019 peter watts is an angry sentient tumor revenge fantasies and essays kindle edition by watts peter download it once and read it on your kindle device pc phones or tablets use features like bookmarks note taking and highlighting while reading peter watts is an angry sentient tumor revenge fantasies and essays

[peter watts is an angry sentient tumor booktopia](#) - Sep 09 2022

web nov 12 2019 description product details

peter watts is an angry sentient tumor apple books - Jul 07 2022

web nov 12 2019 a brilliant bastard cory doctorow comfort of course is the last thing that watts wants to give new york review of science fiction which of the following is true peter watts is banned from the u s watts almost died from flesh eating

peter watts is an angry sentient tumor revenge fantasies and - May 17 2023

web buy peter watts is an angry sentient tumor revenge fantasies and essays by watts peter from amazon s fiction books store everyday low prices on a huge range of new releases and classic fiction peter watts is an angry sentient tumor revenge fantasies and essays amazon co uk watts peter 9781616963194 books

peter watts is an angry sentient tumor revenge fantasies and - Aug 08 2022

web amazon fr peter watts is an angry sentient tumor revenge fantasies and essays watts peter livres livres romans et littérature livres de référence neuf 23 79 tous les prix incluent la tva livraison à 0 01 22 26 avril détails entrez votre adresse habituellement expédié sous 11 à 12 jours quantité ajouter au panier

peter watts is an angry sentient tumor google books - Nov 11 2022

web nov 12 2019 peter watts is an angry sentient tumor revenge fantasies and essays tachyon publications nov 12 2019 fiction 369 pages 0 reviews reviews aren't verified but google checks for

[peter watts is an angry sentient tumor revenge fantasies](#) - Oct 10 2022

web with over fifty unpredictable scathing hilarious and more than occasionally moving essays about science politics family pop culture religion and more peter watts hugo award winning author former marine biologist and angry sentient tumor via annalee newitz author of autonomous shows why he is the savage dystopian optimist whom you can't

[loading interface goodreads](#) - May 05 2022

web discover and share books you love on goodreads

peter watts is an angry sentient tumor revenge fa - Apr 04 2022

web 4 peter watts is an angry sentient tumor revenge fa 2020 08 05 empress through tense alliances and devastating

betrayal the dhai and their allies attempt to hold against a seemingly unstoppable force as enemy nations prepare for a coming together of worlds as old as the universe itself in the end one world will rise and many will perish

tissues organs organ systems article khan academy - Aug 13 2023

web list three human organ systems for each organ system identify some of its organs and functions compare and contrast the male and female reproductive systems for each of

organ systems definition examples diagram vaia - Mar 28 2022

web organ and organ system medium solution verified by toppr organ multiple tissues make up for an organ they perform functions within the body example heart organ

exercise 1 organs systems and organization of the body - Apr 09 2023

web receives and interprets sensory input directs body movements includes memory emotions cognition study with quizlet and memorize flashcards containing terms like muscular

lab ws organs and organ systems la consolacion college - Feb 24 2022

web jun 4 2020 ks3 science edexcel yr7 revision spread and answer sheet biology topic 7a cells tissues and organ systems this a4 revision spread condenses the

cells tissues organs and organ systems 1 2k plays quizizz - Sep 02 2022

web feb 28 2023 endocrine an organ system is a group of organs that work together in the body to perform a complex function such as pumping blood or processing and utilizing

organs and organ systems high school biology varsity tutors - Jan 06 2023

web question 1 of 3 the best definition of an organ system is an organ system is a collection of organs that can function independently an organ system is a group of anatomical

5 1 organs and systems of the human organism - May 10 2023

web terms in this set 23 organ systems define a group of organs that act together to perform particular body function integumentary system major organs skin nails hair

what is the difference between organ and organ system toppr - Jan 26 2022

web an organ is a unit which is an individual part of the body while an organ system is a group of all organs working together to perform and run our body in english organ is also

cells tissues and organs oh my world book - Oct 03 2022

web organ systems 4th grade science worksheets and answer keys study guides covers the following skills know that the human body has many parts that interact to function as

quiz worksheet organ systems study com - Nov 04 2022

web what is the correct order of organization tissue cell organ organ system organism cell tissue organ organ system
organism organism cell tissue organ system organ

organ and organ system meaning diagrams and functions - Apr 28 2022

web how important the different organ and organ system in our body how they interact with one another just as the organs in
an organ system work together to accomplish their

difference between organ and organ system explained - Nov 23 2021

tissues organs and systems 5th grade reading - May 30 2022

web organ systems key takeaways organisms can be broken down into several organisation levels organelles cells tissues
organs organ systems organ systems consist of

exercise 2 organ systems overview quizlet - Oct 15 2023

web assign all of the structures listed above to one of the following organ system categories digestive stomach small intestine
large intestine liver gallbladder rectum mesentery

organ systems major organs and functions flashcards quizlet - Mar 08 2023

web free practice questions for high school biology organs and organ systems includes full solutions and score reporting

10 4 human organs and organ systems biology - Jul 12 2023

web the human organism consists of eleven organ systems they are integumentary system skeletal system muscular system
nervous system endocrine system

human body worksheets easy teacher worksheets - Sep 14 2023

web the human body is vastly complex the worksheets found below will help you understand basic human anatomy and
physiology these worksheets cover a huge scale of topics

lesson 1 2 the human organ systems functions flashcards - Feb 07 2023

web students analyze examples that illustrate how organelles work together to accomplish cellular functions and organs and
organ systems work together to accomplish functions

organ systems all 11 and what they do verywell health - Jun 30 2022

web jan 25 2023 frequently asked questions faqs on organ and organ system q 1 what is the largest organ ans the skin is
the largest organ of the human body q 2

exercises 2 and 3 from lab manual organ systems - Jun 11 2023

web oct 22 2023 brianammy7 terms in this set 25 the scientific study of the structure of the human body is known as
human anatomy organs are grouped into functionally related

structure and function of cells organs and organ systems - Dec 05 2022

web worksheet answer key pencils differentiation considerations for greater challenge require students to define and describe each type of cell tissue organ and system

cells tissues and organ systems revision spread - Dec 25 2021

organ systems 4th grade science worksheets and answer - Aug 01 2022

web multi cellular organisms have many cells that work together in specific ways each group performing certain activities cross curricular focus life science this worksheet is in

mass transfer thomas kilgore sherwood blackwell s - Oct 04 2022

web sherwood pigford wilke mass transfer diffusion preparative chromatography for separation of proteins transport phenomena absorption adsorption calculations and

t k sherwood r l pigford and r l wilke mass transfer - Feb 08 2023

web details edition statement by thomas k sherwood robert l pigford charles r wilke note this ed published in the united states 1975 previous ed published as

mass transfer thomas k sherwood robert l pigford and - Nov 24 2021

web mass transfer thomas k sherwood robert l pigford and charles r wilke mcgraw hill book company 1975 677 pages 21 50 *sherwood pigford wilke mass transfer clr imymac com* - Sep 03 2022

web sherwood pigford wilke mass transfer download sherwood pigford wilke mass transfer pdf found 100 pdf ebooks

sherwood t pigford r and wilke c 1975 mass transfer - Nov 05 2022

web mass transfer mcgraw hill chemical engineering series thomas kilgore sherwood robert l pigford charles r wilke joint author book 01 jan 1975

sherwood pigford wilke - Mar 29 2022

web sherwood pigford wilke mass transfer 3 3 of this industry standard reference includes an entirely new chapter on potable reuse the recycling of treated wastewater into the water

download sherwood pigford wilke mass transfer pdf - Aug 02 2022

web sherwood t k pigford r l wilke c r mass transfer new york mcgraw hill google scholar dwivedi p n upadhyay s n ind eng chem proc des dev 16

mass transfer sherwood worldcat org - Apr 29 2022

web pigford and solved wilke and hougan28 studied the mass transfer bibliografía 1 levenspiel o ingeniería de las mass transfer by diffusion sherwood pigford wilke

sherwood pigford wilke mass transfer verify meetcircle com - Feb 25 2022

web we pay for you this proper as without difficulty as easy artifice to get those all we offer sherwood pigford wilke mass transfer and numerous book collections from fictions to

mass transfer thomas k sherwood robert l pigford charles - May 11 2023

web sherwood thomas k thomas kilgore 1903 1976 published new york mcgraw hill 1975 physical description ix 677 pages illustrations 24 cm additional creators

1903 1976 national academies press - Jul 13 2023

web for sherwood that was the first step in a lifelong dedica tion to mass transfer in chemically related systems a two year appointment as assistant professor at worcester

physico chemical aspects of mass and heat transfer in - Jul 01 2022

web mass transfer by sherwood pigford wilke mc graw hill international view pdf by wg whitman 1962 cited by 176 in the preface to their book absorption and

[download mass transfer by sherwood pigford pdf](#) - May 31 2022

web cookies on oclc websites our web pages use cookies information about how you interact with the site when you select accept all cookies you re agreeing to let your

mass transfer by sherwood thomas kilgore pigford robert - Jan 07 2023

web may 1 1976 mass transfer thomas k sherwood robert l pigford and charles r wilke mcgraw hill book company 1975 677 pages 21 50 mccabe warren l

mass transfer thomas k sherwood robert l pigford and - Dec 06 2022

web sherwood t pigford r and wilke c 1975 mass transfer mcgraw hill inc new york 512 has been cited by the following article title replacement of process scale

sherwood pigford wilke mass transfer - Jan 27 2022

web an introduction to mass and heat transfer sherwood pigford wilke mass transfer downloaded from jmseniorliving com by guest stone nathanael hollow fiber

[mass transfer thomas kilgore sherwood robert lamar](#) - Aug 14 2023

web mass transfer chemical engineering series mcgraw hill chemical engineering series schaum s solved problems authors thomas kilgore sherwood robert lamar

sherwood pigford wilke mass transfer jmseniorliving com - Dec 26 2021

web mass transfer thomas k sherwood robert l pigford and charles r wilke mcgraw hill book company 1975 677 pages 21 50 mccabe 1976 aiche

mass transfer thomas k sherwood robert l pigford and - Oct 24 2021

mass transfer ghent university library - Apr 10 2023

web aug 11 2023 sherwood thomas kilgore robert lamar pigford and charles robert wilke mass transfer new york n y mcgraw hill 1975 apa sherwood t

pdf mass transfer thomas k sherwood robert l - Mar 09 2023

web t k sherwood r l pigford and r l wilke mass transfer mcgraw hill new york 1975 has been cited by the following article title removal of nitrogen dioxide and

mass transfer thomas k sherwood robert l pigford and - Jun 12 2023

web mass transfer thomas k sherwood robert l pigford and charles r wilke mcgraw hill book company 1975 677 pages 21 50 warren l mccabe first published may