EDUDOC SERVICES: CURRENT CONTENT



CURRENT CONTENTS

November - 2019

LIBRARY AND DOCUMENTATION DIVISION

NATIONAL INSTITUTE OF EDUCATION

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Compiled By

J.P. Anand

Introduction

"**Current Contents**" prepared by Library and Documentation Division aims to identify the articles published in the learned journals received by the library in the month of November 2019.

Current Contents are arranged alphabetically under the broad subject headings. It gives the details about the name of the Journal, volume, issue month and year of publication. It will be our endeavour to bring out this as a reference tool, which will make our readers aware about the current contents available in different learned journals of their subject of interest.

Current Contents will be useful to our faculty members in selecting/recommending relevant articles for their research.

Keeping in mind the integration of ICT and Digitisation, attempt has been made to provide the Web-link of the current issues, which will facilitate the readers to access the articles, except the '*' marked journal titles

We eagerly await to received your views and comments.



(Prof. Saroj Yadav)
Chairperson, LDD,
NCERT, New Delhi

Sr. No.	Name of Journals	Vol.	Issue	Month	Year	Pages
❖	**Economics**					
1.	Economist	433	9165 9168 9170	19 Oct 9 Nov 23 Nov	2019	26-31
2.	Quarterly Journal of Economics	134	4	Nov	2019	78
❖	**Education**					
3.	Educational Policy	33	6	Sep	2019	34
4.	International Journal of Educational Development	66		Apr	2019	38-39
5.	International Journal of Inclusive Education	23	11-12	Nov-Dec	2019	40
❖	**Educational Psychology**					
6.	Journal of Educational Psychology	111	8	Nov	2019	50-51
	Educational Research					
7.	शैक्षणिक संदर्भ	12	67(124)	Sep-Oct	2019	84
8.	Applied Measurement in Education	32	4	Oct-Dec	2019	5
9.	Australian Journal of Education	63	2	Aug	2019	6
10.	Educational Action Research: an International Journal	27	4	Nov	2019	32
11.	Educational Evaluation and Policy Analysis	41	3	Sep	2019	33
12.	Educational Research	61	4	Dec	2019	35
13.	Review of Educational Research	89	5	Oct	2019	83
14.	Scandinavian Journal of Educational Research	63	7	Dec	2019	85
❖	**Educational Technology**					
15.	British Journal of Educational Technology	50	6	Nov	2019	7
16.	Computers and Education	141		Nov	2019	15-16
❖	**Environmental Education**					
17.	Resurgence & Ecologist		317	Nov-Dec	2019	81-82
❖	**Geography**					
18.	National Geographic Magazine	7	4	Nov	2019	61-62
❖	**Higher Education**					
19.	University News	57	46	18-Nov	2019	107-108

❖	**Linguistics**					
20.	Natural Language and Linguistic Theory	37	4	Nov	2019	63
❖	**Mathematics Education**					
21.	School Science and Mathematics	119	6	Oct	2019	86
❖	**Physics**					
22.	American Journal of Physics	87	11	Nov	2019	1-2
23.	Physics Education	54	6	Nov	2019	68-69
24.	Physics Today	72	10	Oct	2019	70-71
25.	Physics World	32	10	Oct	2019	72
26.	Pramana: Journal of Physics	93	5	Nov	2019	73-74
❖	**Population Education**					
27.	Daedalus	148	4	Fall	2019	24-25
❖	**Psychology**					
28.	American Psychologist	74	7	Oct	2019	3-4
29.	Cognitive Psychology	113	-	Sep	2019	14
30.	Journal of Applied Social Psychology	49	10	Oct	2019	41
31.	Journal of Counseling Psychology	66	5 6	Oct Nov	2019	42-47
32.	Journal of Cross-Cultural Psychology	50	7	Aug	2019	48
33.	Journal of Humanistic Psychology	59	5 6	Sep Nov	2019	55-56
34.	Psychological Bulletin	145	11	Nov	2019	75
35.	Psychological Review	126	5 6	Oct Nov	2019	76-77
❖	**Science**					
36.	Current Science	117	7 8 9	10 Oct 25 Oct 10 Nov	2019	17-23
37.	New Scientist	243	3249 3250 3253 3255	28 Sep 5 Oct 26 Oct 9 Nov	2019	64-67
38.	Science	365	6460 6461 6463 6465	27 Sep 4 Oct 18 Oct 1 Nov	2019	89-98

			6466	8 Nov		
39.	Journal of Research in Science Teaching	56	8	Oct	2019	58
40.	Resonance: Journal of Science Education	24	11	Nov	2019	80
41.	Scientific American	321	5	Nov	2019	99-100
42.	School Science Review	101	374	Sep	2019	87-88
43.	Studies in Science Education	55	1	Mar	2019	102
❖	**Social Science**					
44.	Indian Journal of Gender Studies	26	3	Oct	2019	36-37
45.	Journal of Democracy	30	4	Oct	2019	49
46.	Man and Development *	41	3	Sep	2019	60
47.	Social Studies	110	1-3	Jan-Jun	2019	101
48.	Young Children	74	5	Nov	2019	109-110
❖	**Special Education**					
49.	British Journal of Special Education	46	3	Sep	2019	10
50.	Remedial and Special Education	40	4	Aug	2019	79
51.	Journal of Learning Disabilities	52	5	Sep-Oct	2019	57
❖	**Teacher Education**					
52.	Journal of Education for Teaching	45	1 2 3	Feb Apr Jun	2019	52-54
53.	Journal of Teacher Education	70	4	Sep-Oct	2019	59
54.	Teaching and Teacher Education: An International Journal of Research and studies	69 86		Jan Nov	2018 2019	103-106
❖	**Values Education**					
55.	Childhood: A Journal of Global Child Research	26	4	Nov	2019	12-13

AMERICAN JOURNAL of PHYSICS

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Volume 87, No. 11
November 2019

Cover figure: A visualization of the process of diagonalizing a Hamiltonian. On the left of every panel is a graphical representation of the size of the elements of the Hamiltonian matrix in the chosen basis (darker is larger); on the right is the picture of the corresponding wave functions. For details see the article on p. 857.

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868 **Conservation laws and energy transformations in a class of common physics problems** — *Jonathan Bougie and Asim Gangopadhyaya*

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885 **Demonstrating the elliptical orbit of Mars using naked eye data** — *Kevin Krisciunas*

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910 **Damped harmonic oscillation: Linear or quadratic drag force?** — *R. Hauko and R. Repnik*

915 **Diamagnetic behavior in random classical radiation** — *Timothy H. Boyer*

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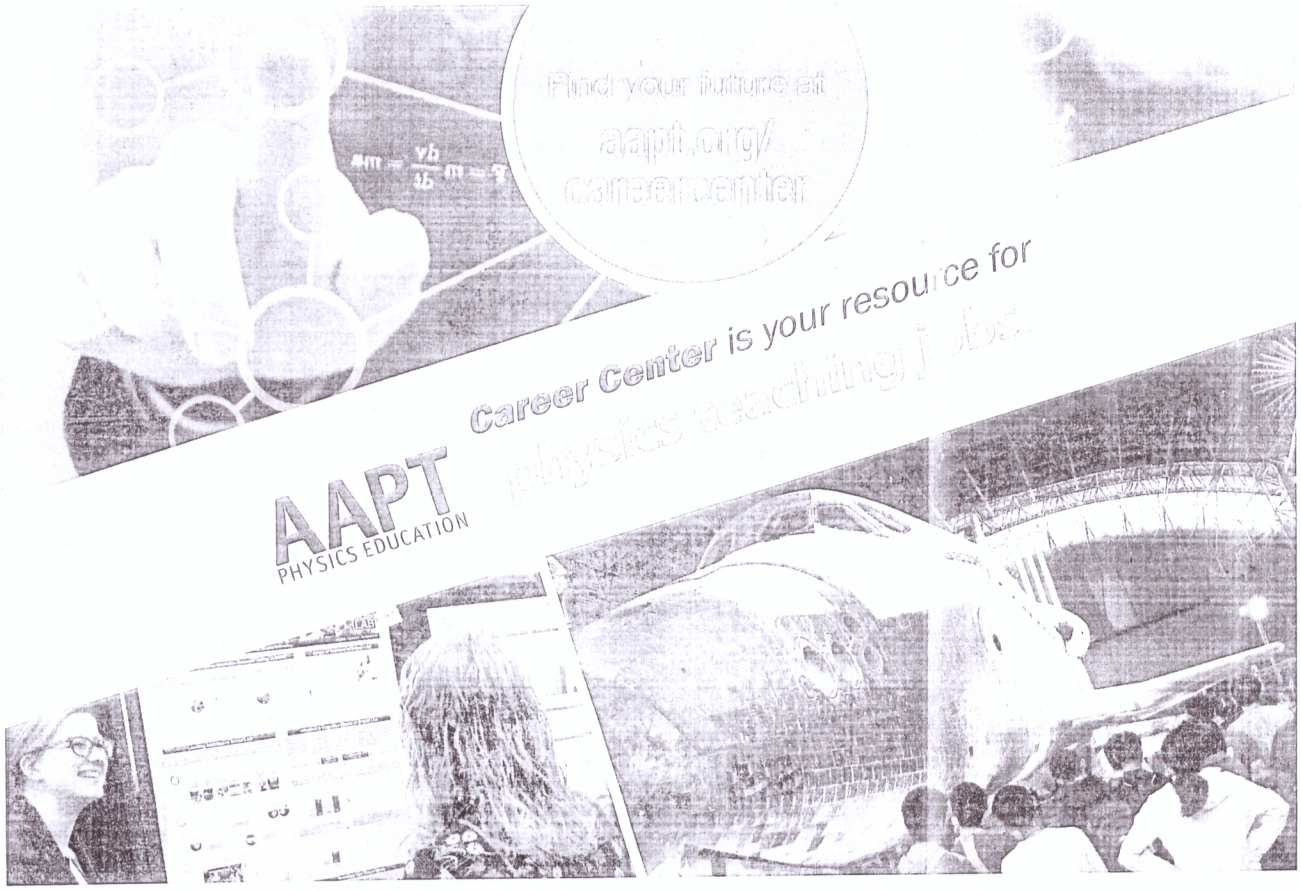

AMERICAN PSYCHOLOGIST®

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https://www.apa.org/pubs/journals/amp

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On the cover: Mirror Mobiles, *2019, by Summer Yates. Found mirror, steel wire, and mirror adhesive, 12 feet by 6 feet. Courtesy of the artist, http://summeryates.org. See p. 852 for more about Yates and her art.*

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751 The Socioecological Psychology of Upward Social Mobility
Shigehiro Oishi, Minkyung Koo, and Nicholas R. Buttrick

The opportunity for children from poorer households to move up the economic ladder is a hallmark of a just society. In a series of studies, the authors found that intergenerational upward mobility was substantially higher in walkable cities (e.g., New York City, Pittsburgh) than in less walkable cities (e.g., Houston, Atlanta).

764 Scientific Imperatives Vis-à-vis Growing Inequality in America
Julie A. Kirsch, Gayle D. Love, Barry T. Radler, and Carol D. Ryff

Twenty-five years ago Adler and colleagues (1994) called for psychologists to actively study socioeconomic inequality and health. Today, inequality continues to be a pressing issue in America. Comparing two national samples recruited two decades apart, the present article documents historical changes in socioeconomic inequality, physical health, and well-being and elaborates on further research opportunities to be pursued by the scientific community.

778 Revisiting Theory on Research Use: Turning to Policymakers for Fresh Insights
Karen Bogenschneider, Elizabeth Day, and Emily Parrott

What is the role of research in guiding public policy? Turning to policymakers themselves offered fresh insights into this question that has confounded researchers since the origins of scientific inquiry. Policymakers described 14 contributions that research makes to policymaking, which are compared to the predictions of four prominent theories of research utilization. Four contributions of research frequently mentioned by policymakers were seldom or never predicted by theory.

794 What Is It to Discipline a Child: What Should It Be? A Reanalysis of Time-Out From the Perspective of Child Mental Health, Attachment, and Trauma
Mark R. Dadds and Lucy A. Tully

Criticism of 'time-out' with children is rife in the popular media and largely based on perceived threat to children's attachment, especially for those with trauma histories. This review finds that, when used appropriately, time-out is not harmful and can actually help repair attachment and trauma problems.

809 Rethinking the Nature of Cruelty: The Role of Identity Leadership in the Stanford Prison Experiment
S. Alexander Haslam, Stephen D. Reicher, and Jay J. Van Bavel

Archival evidence shows that experimenters' leadership was central to events and outcomes in the Stanford Prison Experiment. This paper examines and explains the nature of this leadership. It argues that, as in other instances of tyranny, this took the form of *identity leadership* that encouraged participants to identify with an ostensibly noble cause and to see cruelty as essential to the advancement of that cause.

823 Debunking the Stanford Prison Experiment
Thibault Le Texier

The Stanford Prison Experiment has long been held as a landmark study in psychology. The author's detailed analysis of its archives reveals numerous flaws in the experiment, raising questions about the study's scientific validity. The article also discusses the longevity of the experiment in spite of these issues.

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BJSE

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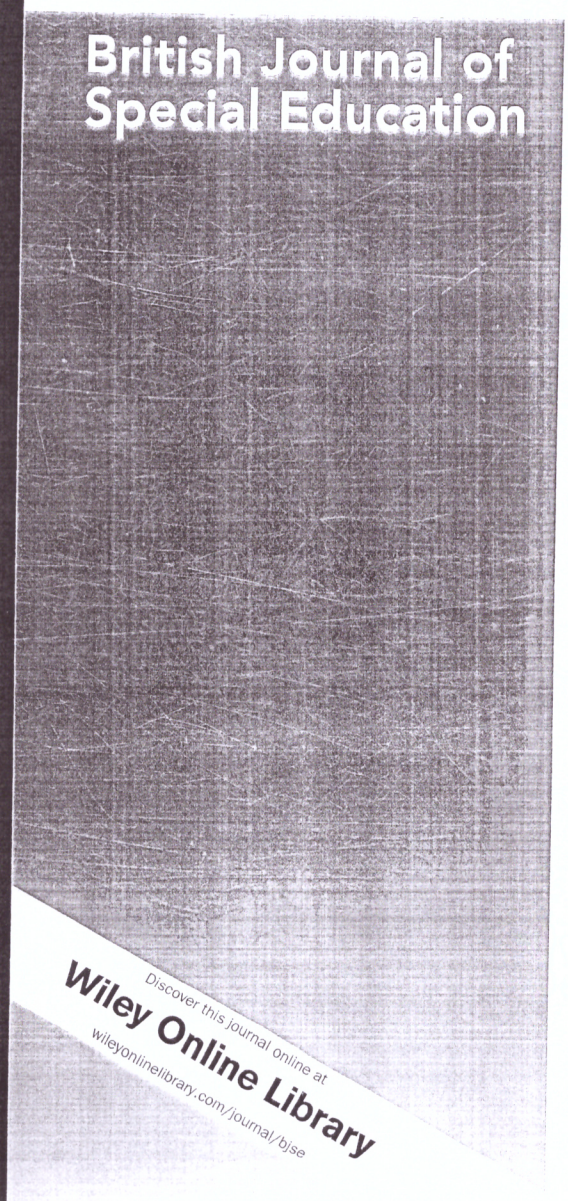

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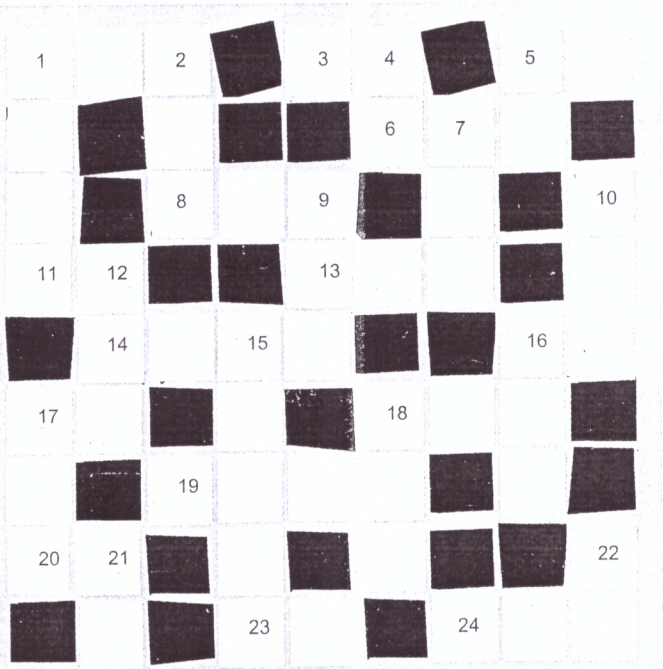
14 नवम्बर बच्चों का दिन है। तो हमने सोचा कि नवम्बर के अंक में बच्चों की खूब सारी रचनाएँ हों। कहानियाँ, कविताएँ, किस्से, पुस्तक समीक्षा, क्यों-क्यों... पढ़कर हमें बताना कि तुम्हें कैसे लगे।

400 वाँ अंक

जनवरी का अंक चकमक का 400वा अंक होगा। इस अवसर पर हम एक विशेषांक तैयार कर रहे हैं। तुम भी 400वे अंक के लिए कुछ लिखकर भेजो - आसपास की खबरें, कहानी, कविता, पहेली, किसी दिलचस्प व्यक्ति से तुम्हारी मुलाकात के बारे में, तुमसे बनाई हुई कोई चित्र, खाने की चीज़ या क्राफ्ट...



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कविता तिवारी
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डिज़ाइन
कनक शशि

सलाहकार
सी एन सुब्रह्मण्यम्
शशि सबलोक

आवरण चित्र: ऋषभ, छठवीं, अक्षरनन्दन स्कूल, पुणे, महाराष्ट्र

वितरण
झनक राम साहू

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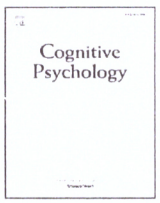

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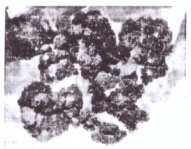

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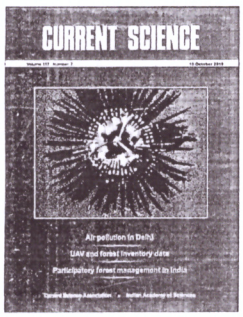

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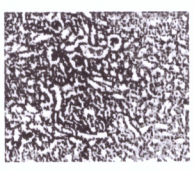

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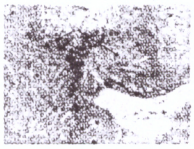

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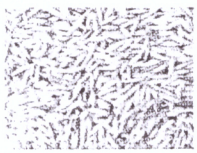

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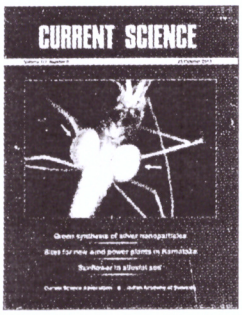

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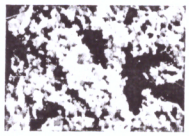

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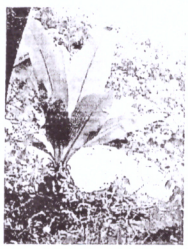

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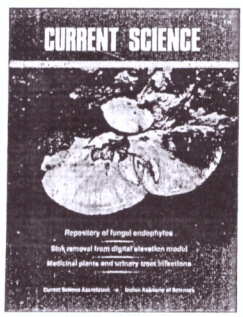

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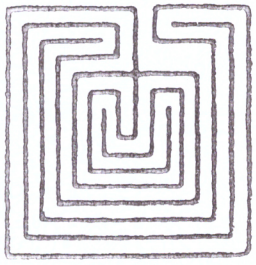

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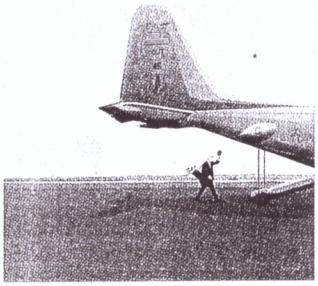

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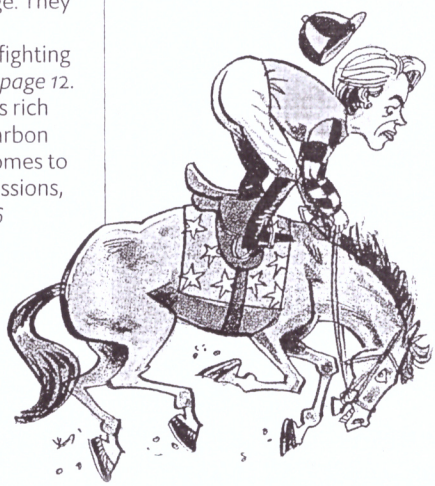

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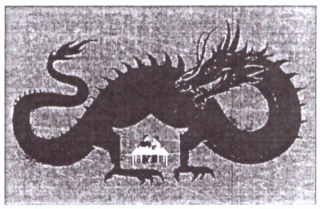

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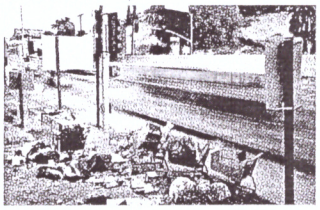

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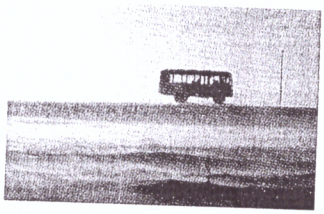

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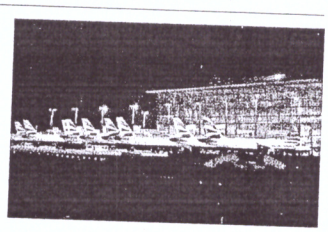

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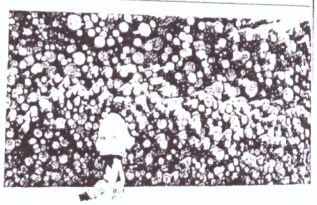

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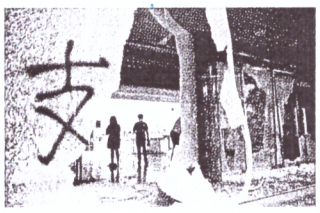

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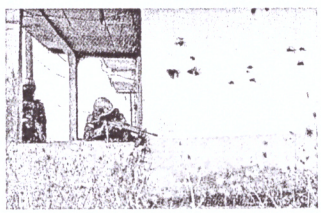

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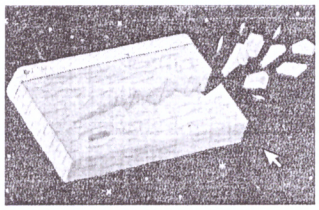

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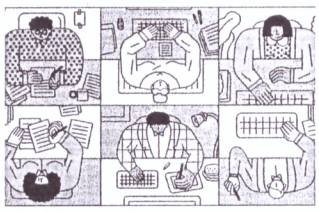

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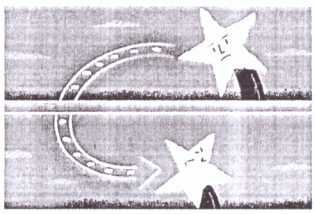

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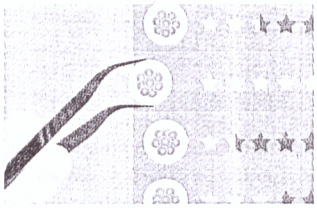

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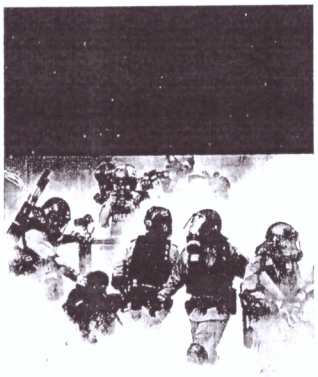

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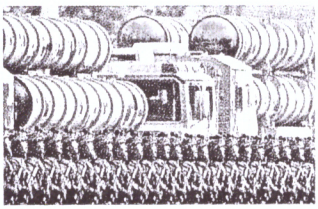

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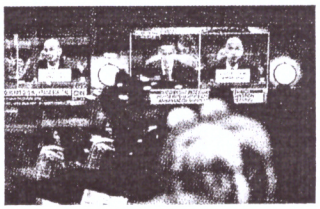

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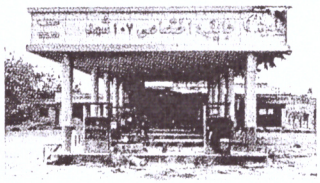

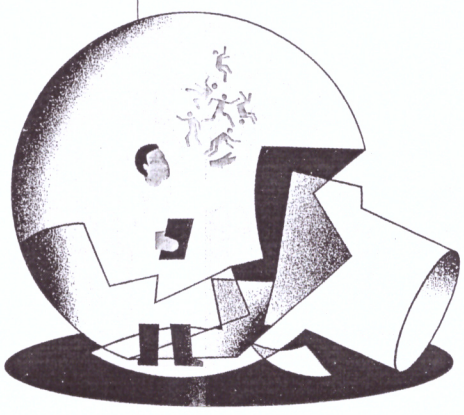

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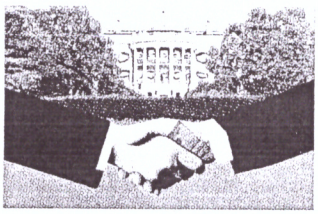

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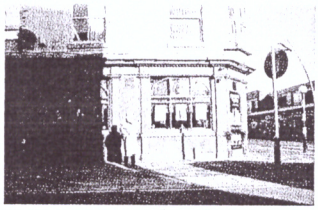

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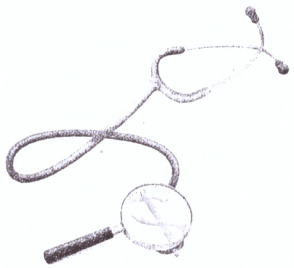

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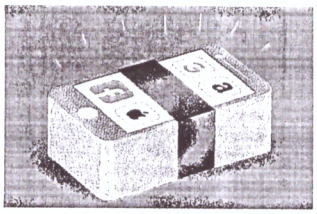

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Special Issue: Lesson Study, Learning Study and Action Research
Guest Editors: Barbara Hanfstingl, Franz Rauch and Stefan Zehetmeier

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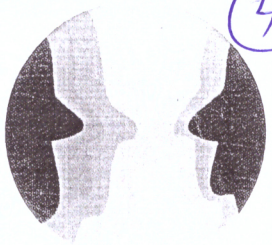

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October 2019
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Number 5

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Articles

519 Objectification of Sexual Minority Women: Responses, Consequences, and Resistance
Bonnie Moradi, Elliot A. Tebbe, Kathleen E. Connelly, Alexandra L. Lenzen, and Mirella J. Flores

Findings from this study suggest the need to broaden conceptualizations of responses to objectification in research and practice to account for the complex co-occurrence of multiple responses. Similarly, the negative consequences of objectification co-occur with sexual minority women's resilience. Findings also reveal that sexual minority women resist against objectification using a range of personal, relational, and identity-related strategies.

534 Development and Initial Validation of the Therapist Cultural Comfort Scale
Andrés E. Pérez-Rojas, Theodore T. Bartholomew, Allison J. Lockard, and Jazmin M. González

This study reports the development of the Therapist Cultural Comfort Scale, a new scale designed to measure clients' perceptions of their therapist's cultural comfort during session. Additionally, this study highlights the role of cultural comfort in effective psychotherapy.

550 Psychological Processes Underlying the Impact of Gender-Related Discrimination on Psychological Distress in Transgender and Gender Nonconforming People
Joda Lloyd, Vikki Chalklin, and Frank W. Bond

This study advanced understanding of how experiences of gender-related discrimination may lead to symptoms of psychological distress in transgender and gender nonconforming (TGNC) people. It also responded to recent calls for more methodologically sophisticated research into the needs and experiences of this underserved population.

564 Healing Through Community Connection? Modeling Links Between Attachment Avoidance, Connectedness to the LGBTQ+ Community, and Internalized Heterosexism
Shayne Sanscartier and Geoff MacDonald

This study suggests reduced connection to the LGBTQ+ community might help explain links between attachment avoidance and internalized heterosexism. Counselors taking an attachment-based approach to sexual minority stress may benefit from exploring both personal and collective elements of identity development.

577 Mexican American Women College Students' Willingness to Seek Counseling: The Role of Religious Cultural Values, Etiology Beliefs, and Stigma
Na-Yeun Choi, Helen Youngju Kim, and Elisabeth Gruber

Our findings highlight the importance of exploring within-group differences among Mexican American college women and of considering the complex ways in which individuals espouse ethnic and religious cultural factors, which can influence their help-seeking processes.

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588 Anticipation of Racism and Sexism: Factors Related to Setting Career Goals for Urban Youth of Color
Julia L. Conkel-Ziebell, George V. Gushue, and Sherri L. Turner
Urban youths' of color anticipation of racial discrimination in the workplace is variously related to how they perceive their ability to engage in career decision making, their expected vocational outcomes, and the goals they set. Anticipation of racial discrimination attenuates boys' beliefs in their own decision-making skills and girls' expectations for vocational success, suggesting that, for these young people, identifying strategies for managing racism is an essential part of setting clear, viable career goals.

600 A Qualitative Investigation of Beliefs About Work-Related Crises in the United States
Saliha Kozan, David L. Blustein, Rachel Paciorek, Erin Kilbury, and Erkan Işık
The present study shares insights from a diverse group of Americans on the crises about work in the United States. Highlighting the importance of research that affirms the lived experience of people confronting an ever-changing world of work as a source of knowledge for theory, practice, and public policy, this study contributes to the literature on the nature of work in contemporary United States.

613 Investigating the Impact of Early Alliance on Predicting Subjective Change at Posttreatment: An Evidence-Based Souvenir of Overlooked Clinical Perspectives
Christoph Flückiger, Peter Hilpert, Simon B. Goldberg, Franz Caspar, Christine Wolfer, Judith Held, and Andreea Vîslă
Despite ongoing encouragement to systematically consider patient-centered outcomes in clinical research, subjective change measures (i.e., how patients evaluate the *change* during psychotherapy) are still neglected in guidelines of how to conduct trial research. The present study shows that the alliance–outcome relation is dependent on the number of aggregated alliance assessments, the type of outcome assessment (i.e., distress vs. subjective change measures) and whether intake and early response are adjusted for or not. Aggregated early alliance assessments were shown to relate most strongly to retrospectively evaluated subjective change at posttreatment. Examining associations with subjective change measures provide additional clinical perspectives on process and outcomes when conducting clinical trials and routine outcome monitoring.

626 College Students' Barriers to Seeking Mental Health Counseling: Scale Development and Psychometric Evaluation
Munyi Shea, Y. Joel Wong, Kimmy K. Nguyen, and Patricia D. Gonzalez
This project reports a newly developed multidimensional measure assessing six specific types of perceived barriers to seeking mental health counseling, and their associations with various criterions of help-seeking decision making among ethnically diverse college students. Findings could inform prevention, intervention, and counselor training efforts on college campuses to promote college students' psychological well-being.

640 The Codevelopment of Group Relationships: The Role of Individual Group Member's and Other Group Members' Mutual Influence and Shared Group Environment
Gianluca Lo Coco, Salvatore Gullo, Gabriele Profita, Chiara Pazzagli, Claudia Mazzeschi, and Dennis M. Kivlighan Jr.
This study suggests that there is a mutual influence between the perceptions of the individual group member and the rest of the group regarding group therapy relationships. Additionally, it highlights how an individual group member and other group members codevelop a similar perception of the group relationship. However, the specific type of influence was related to the stage of group development and the specific dimension of group relationships examined.

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November 2019

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Articles

651 "I Have Strong Medicine, You See": Strategic Responses to Racial Microaggressions
Sara Houshmand, Lisa B. Spanierman, and Jack De Stefano

This study, set in Canada, is the first to examine responses to racial microaggressions among community members who did not pursue postsecondary education and who were not affiliated with academia. Findings suggest working class community members used dynamic interpersonal responses, and underscore the role of social resources, cultural values and macrointervention in dismantling racial microaggressions.

665 Longitudinal Associations Between Marianismo Beliefs and Acculturative Stress Among Latina Immigrants During Initial Years in the United States
Melissa M. Ertl, Roberto Rentería, Frank R. Dillon, Rosa Babino, Mario De La Rosa, and Rachel E. Brenner

This study suggests that Latina young adult immigrants' endorsement of certain traditional gender role beliefs may lead to experiences of acculturative stress, and recent immigrants may reduce or increase their endorsement of these beliefs in response to experiencing acculturative stress. Counseling interventions that focus on reducing acculturative stress may consider how the role of the family may be protective against stress. Attending to gender role beliefs in counseling may help facilitate a healthy transition to the United States for recent immigrants who may experience a peak in acculturative stress after immigration or may alter their endorsement of traditional gender role beliefs over time in the United States.

678 Cultural Incongruity Predicts Adjustment to College for Student Veterans
Lisa M. McAndrew, Sarah Slotkin, Justin Kimber, Kieran Maestro, L. Alison Phillips, Jessica L. Martin, Marcus Credé, and Austin Eklund

This study found that feelings of not belonging or feeling misunderstood, what psychologists call cultural incongruity, predicts student veterans' adjustment to college.

690 Viewing the Career Indecision Profile Within a Theoretical Context: Application of the Social Cognitive Career Self-Management Model
Robert W. Lent, Ruogu J. Wang, Taylor R. Morris, Glenn W. Ireland, and Lee T. Penn

We tested a theoretical framework for the Career Indecision Profile, finding that its scales parallel common constructs in the social cognitive model of career self-management. The findings suggest the ways in which several negative and positive factors may operate together in the career decision-making process.

701 Application of the Psychology of Working Theory With Korean Emerging Adults
Haram J. Kim, Ryan D. Duffy, Seran Lee, Jinkoo Lee, and Ki-Hak Lee

This study suggests that emerging adults' economic resources impact positive career outcomes via impacting psychological abilities. Based on the results, we propose that interventions based on these malleable psychological abilities may be targets when working with emerging adults experiencing economic constraints.

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Evgenia Milman, Robert A. Neimeyer, Marilyn Fitzpatrick, Christopher J. MacKinnon, Krista R. Muis, and S. Robin Cohen
This study provides support for the role of meaning making in the development of prolonged grief disorder symptomatology, suggesting that risk factors for prolonged grief worsen symptoms of prolonged grief by hindering meaning making such that the bereft struggle to "make sense" of the death. These findings facilitate understanding of how severe grief develops and suggest a clinical focus on facilitating meaning making among at-risk grievers.

726 Postelection Stress: Symptoms, Relationships, and Counseling Service Utilization in Clients Before and After the 2016 U.S. National Election
Kevin S. McCarthy and Joshua V. Saks
Postelection stress in clients may be experienced as ongoing relationship conflict. Incorporating political discussion into counseling can assist clients with reactions to social events, and counseling methods might improve difficult interactions around politics.

736 Prediction of Treatment Outcome in Psychotherapy by Patient Initial Symptom Distress Profiles
Carl-Johan Uckelstam, Björn Philips, Rolf Holmqvist, and Fredrik Falkenström
This study demonstrates the importance of considering specific compositions of patient rated psychological distress at the first treatment session to predict recovery rate. Better understanding of how baseline factors relate to outcome in psychotherapy enables guidance for clinicians and can facilitate treatment planning as well as evaluation of treatment response in ongoing treatments (treatment monitoring).

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747 Moderators of the Efficacy of a Web-Based Stress Management Intervention for College Students
Carissa Coudray, Riley Palmer, and Patricia Frazier
In nonclinical samples of college students, a web-based stress management intervention was more effective for students with higher levels of stress, depression, and anxiety. Students could be selected to receive the intervention if they report at least moderate symptom levels. Students who were less distressed experienced little benefit.

755 Masculine Gender Role Stress and Self-Stigma of Seeking Help: The Moderating Roles of Self-Compassion and Self-Coldness
Nathan R. Booth, Ryon C. McDermott, Hsiu-Lan Cheng, and Nicholas C. Borgogna
Restrictive gender roles and stigma of seeking psychological help are prominent barriers to men's help seeking. The present study suggests that increasing men's self-compassion could help them overcome masculine gender role socialization related to stigma of seeking help.

763 The Detrimental Effect of Fragile Groups: Examining the Role of Cultural Comfort for Group Therapy Members of Color
D. Martin Kivlighan III, Joanna M. Drinane, Karen W. Tao, Jesse Owen, and William Ming Liu
Informed by White fragility theory, this study tested the proposition that the cultural comfort of therapy groups would impact Members of Color and White members differently. Results indicated that Members of Color reported less improvement and higher cultural concealment in fragile groups, or groups that lacked cultural comfort, unlike White members.

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Journal of Education for Teaching
International research and pedagogy
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Special Issue: Innovation in Teacher Education: towards a critical re-examination
Guest Editors: Viv Ellis, Mariana Souto-Manning and Keith Turvey

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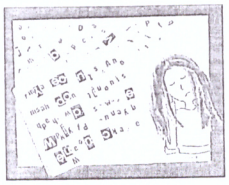

About the Artist: Natalie A. Smith is 14 years old and in the ninth grade. She created this artwork, "Dyslexia," in her eighth-grade art class. Her teacher submitted her work to the Scholastic Art Awards in Connecticut. It was accepted, and Natalie won an award for her artwork depiction of having dyslexia. Her artwork was then on display as part of an exhibition in the Silpe Gallery at the Hartford Art School, University of Hartford, from January 14 through February 2, 2018. In November, at the national conference for the Council of Social Work Education, Natalie also assisted in a presentation, "Diagnosing Dyslexia: Social Workers Leading Inter-professional Education to Support Students with Dyslexia." Additionally, Natalie is assisting with a book to increase parent understanding of dyslexia.

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NATIONAL GEOGRAPHIC
NOVEMBER 2019

DEMANDING EQUALITY, AND POWER, IN AMERICA

Women must reject

THE

subordinate status that society confers. PAGE 22

BY MICHELE NORRIS





Actress Dorothy Newell became a national sensation in 1915 after painting her demand on her back.

FRAMING HISTORY IN PHOTOS ↓

National Geographic's archive contains millions of images. Consider what they reveal about the lives of women. PAGE 42

BY SARAH LEEN



A Kenyan woman with her pet, a juvenile antelope



Usha Vishwakarma demonstrates self-defense techniques to students in Ramgarh, Rajasthan.

A RIGHT TO BE SAFE

Urban India's women have long risked harm just of by walking down

THE STREET.

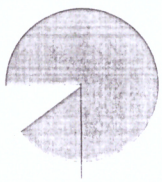
Now there are signs of progress in burgeoning programs to make spaces safer and increase penalties for assailants. PAGE 58

BY NILANJANA BHOWMICK PHOTOGRAPHS BY SAUMYA KHANDELWAL

PROSPERITY, PROGRESS, AND PERIL: THE INDEX

Measuring women's sense of inclusion, security, and discrimination around the world. PAGE 66

BY IRENE BERMAN-VAPORIS, LAWSON PARKER, AND ROSEMARY WARDLEY



90% of countries have one or more laws that discriminate against women.

of national legislative seats are held by women.



3% of countries afford women and men equal legal rights.

GEORGE RINHART, CORBIS VIA GETTY IMAGES; UNDERWOOD AND UNDERWOOD, PRE-1910

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WHAT ADVICE WOULD YOU GIVE TO YOUNG WOMEN?
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Maria Grazia Chiuri is the first woman creative director in the Dior fashion house's 72-year history.

SHAPING THE FUTURE ↑

In numerous male-dominated societies, women aren't waiting for men to cede or share authority. Instead they organize, legislate, campaign, and

MARCH

to secure roles, rights, and privileges often reserved for men. "Women find strength to fight," says one, "in their own way." PAGE 74

BY RANIA ABOUZEID PHOTOGRAPHS BY LYNN JOHNSON

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Top, left to right: student Janae' Sumter at Atlanta's Spelman College; teen Carolyn McDermott on a Nebraska farm; author Roxane Gay. Middle: scientist Jennifer Doudna; an Ouled Nail woman in Algeria; Kenyan student Jessica Chege. Bottom: hand-tinted photo of a Japanese woman; Jane Goodall in Tanzania; woman draped in silk.

WHERE ARE THE WOMEN IN SCIENCE?

During women's long history in the sciences, they've been handicapped by sexism and harassment. PAGE 102

BY ANGELA SAINI
ILLUSTRATIONS BY LAUREN BREVNER

FOR GIRLS IN SCIENCE, THE TIME IS NOW

Encouragement for girls' STEM ambitions is replacing some of the barriers that frustrated previous generations. PAGE 114

BY CLAUDIA KALB
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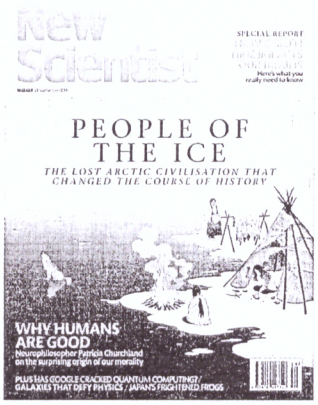

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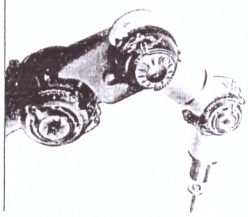

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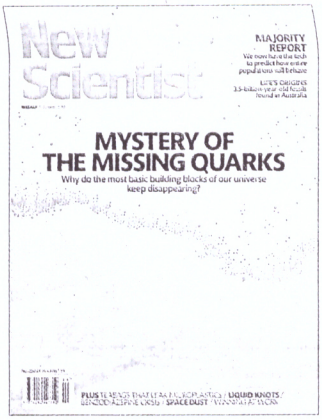

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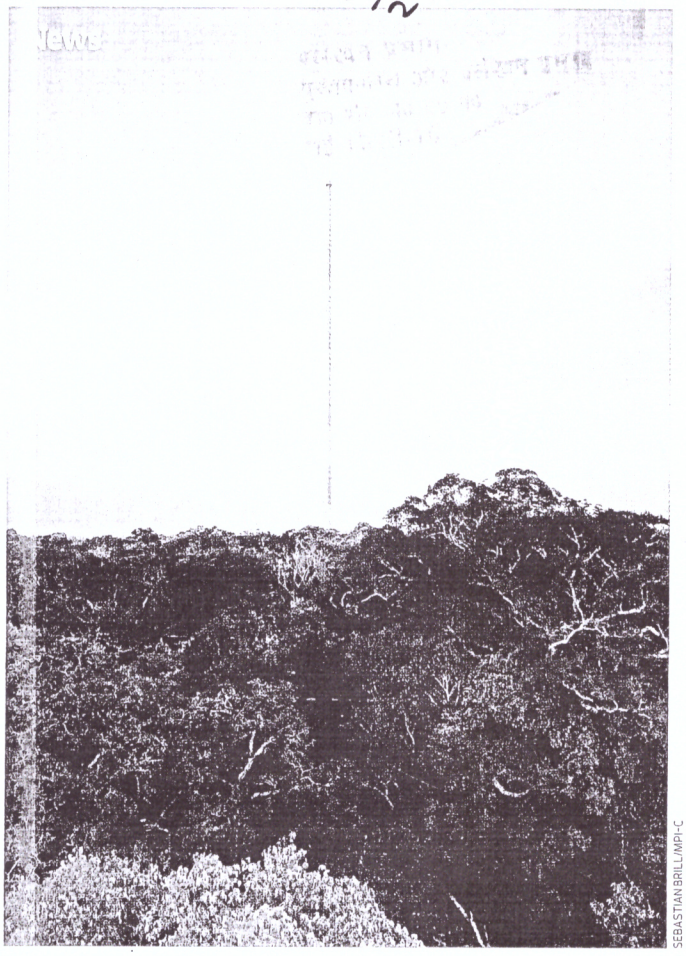

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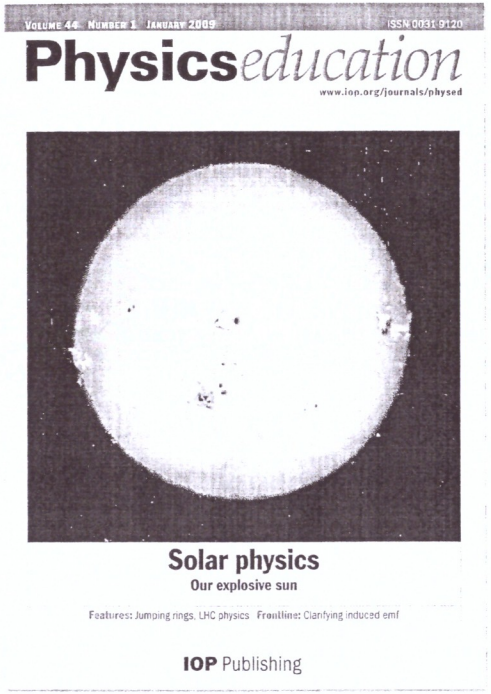

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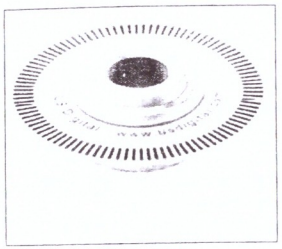

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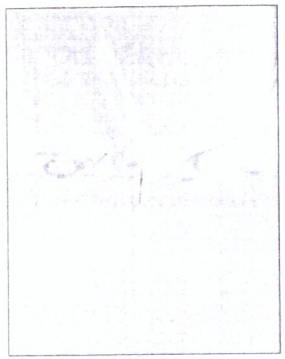

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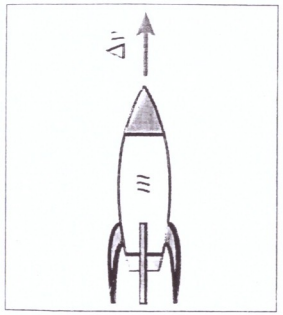

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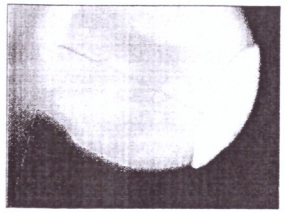

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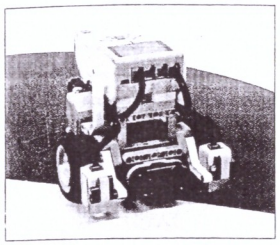

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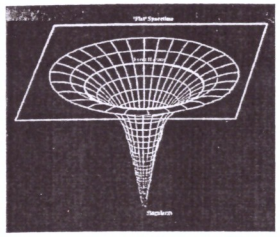

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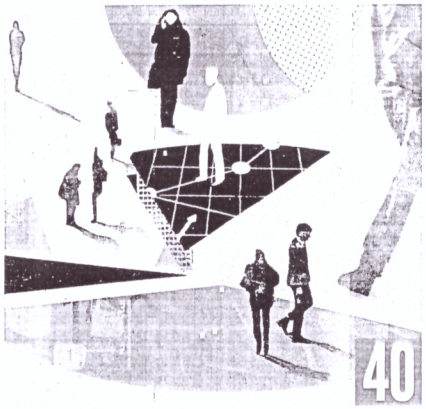



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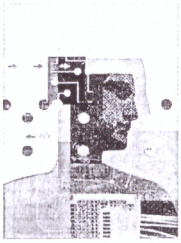

ON THE COVER: Our first annual careers issue focuses on three aspects of becoming and being a physicist: the paths that physical scientists pursue 10 years after obtaining their PhD, the case for including innovation and entrepreneurship in the undergraduate physics curriculum, and the efforts of a consortium of California colleges and universities to boost the number of women and underrepresented minorities in graduate school. Be sure also to turn to Elizabeth Frank's commentary on **page 10** and the news stories starting on **page 24**. (Image by Stuart Kinlough/Alamy Stock Photo.)

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Nobel season

The 2019 Nobel Prizes will be announced 7–14 October, and PHYSICS TODAY has them covered. Before the awards, explore an in-depth analysis of the pioneering physics papers that have garnered Nobel recognition. Then on 8 October, visit physicstoday.org for a full report on the newly announced physics laureates.

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MICHELLE MILNE

Fostering inclusivity

Nearly 75% of undergraduate women in physics experience sexual harassment, according to one study. Education in the classroom can help combat the problem. PHYSICS TODAY's Heather Hill profiles efforts by physics faculty at St Mary's College of Maryland to create a welcoming environment.

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Element hunters

The addition of new elements to the periodic table garners much publicity. Yet the technicians who produce the ultrapure ingredients that are forged together are often overlooked and underappreciated. Claire Jarvis highlights the work that makes superheavy element production possible.

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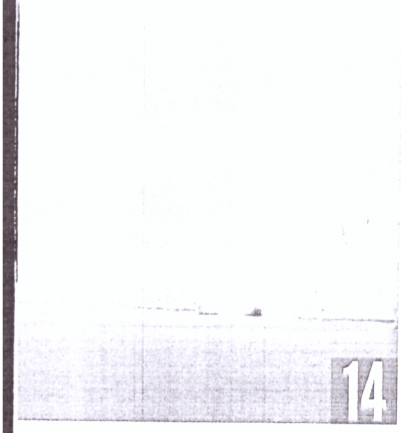

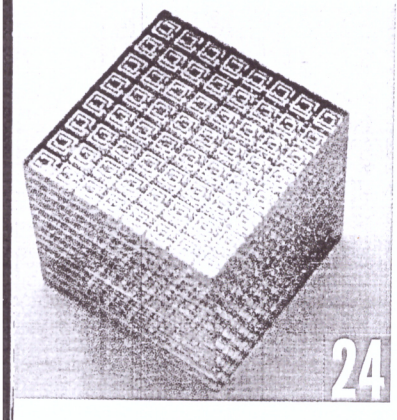

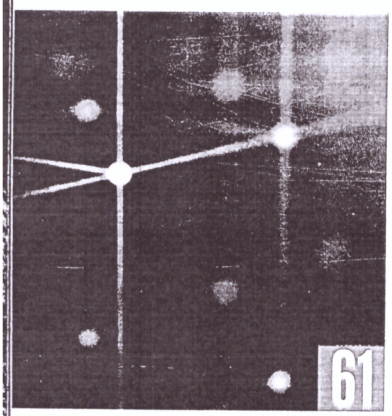

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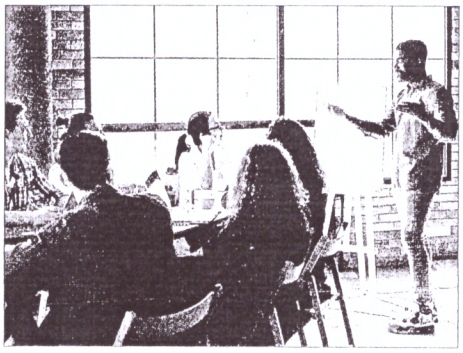

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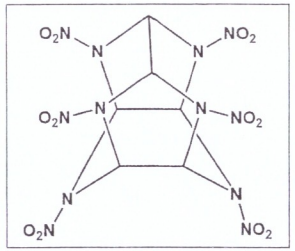

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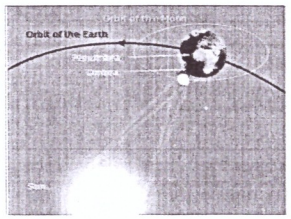

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www.baraccowright.com

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Front cover image: Photographic periodic table and element images © 2019 Theodore Gray from *The Elements: A Visual Exploration of Every Known Atom in the Universe* periodictable.com

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For all practical procedures described in *SSR*, we have attempted to ensure that:
- all recognised hazards have been identified;
- appropriate precautions are suggested;
- where possible procedures are in accordance with commonly adopted model risk assessments;
- if a special risk assessment is likely to be necessary this is highlighted.

However errors and omissions can be made, and employers may have adopted different standards. Therefore, before any practical activity, teachers should always check their employer's assessment. Any local rules issued by their employer must be obeyed, whatever is recommended in *SSR*.

Unless the context dictates otherwise it is assumed that:
- practical work is conducted in a properly equipped laboratory;
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- care is taken with normal laboratory operations such as heating substances or handling heavy objects;
- good laboratory practice is observed when chemicals or living organisms are handled;
- eye protection is worn whenever there is any recognised risk to the eyes;
- fieldwork takes account of any guidelines issued by the employer;
- pupils are taught safe techniques for such activities as heating chemicals or smelling them, and for handling microorganisms.

Readers requiring further guidance are referred to:
Hazcards (CLEAPSS, 2016 and updates)
Topics in Safety, 3rd edn (ASE, 2001; updates available at www.ase.org.uk/resources/topics-in-safety
Safeguards in the School Laboratory, 11th edn (ASE, 2006)
Preparing COSHH Risk Assessments for Project Work in Schools (SSERC, 1991)
SSERC hazardous chemicals database (www.sserc.org.uk/health-safety/chemistry-health-safety/hazchem_database-2/)
Be Safe! Health and Safety in School Science and Technology for Teachers of 3- to 12-Year-olds, 4th edn (ASE, 2011)

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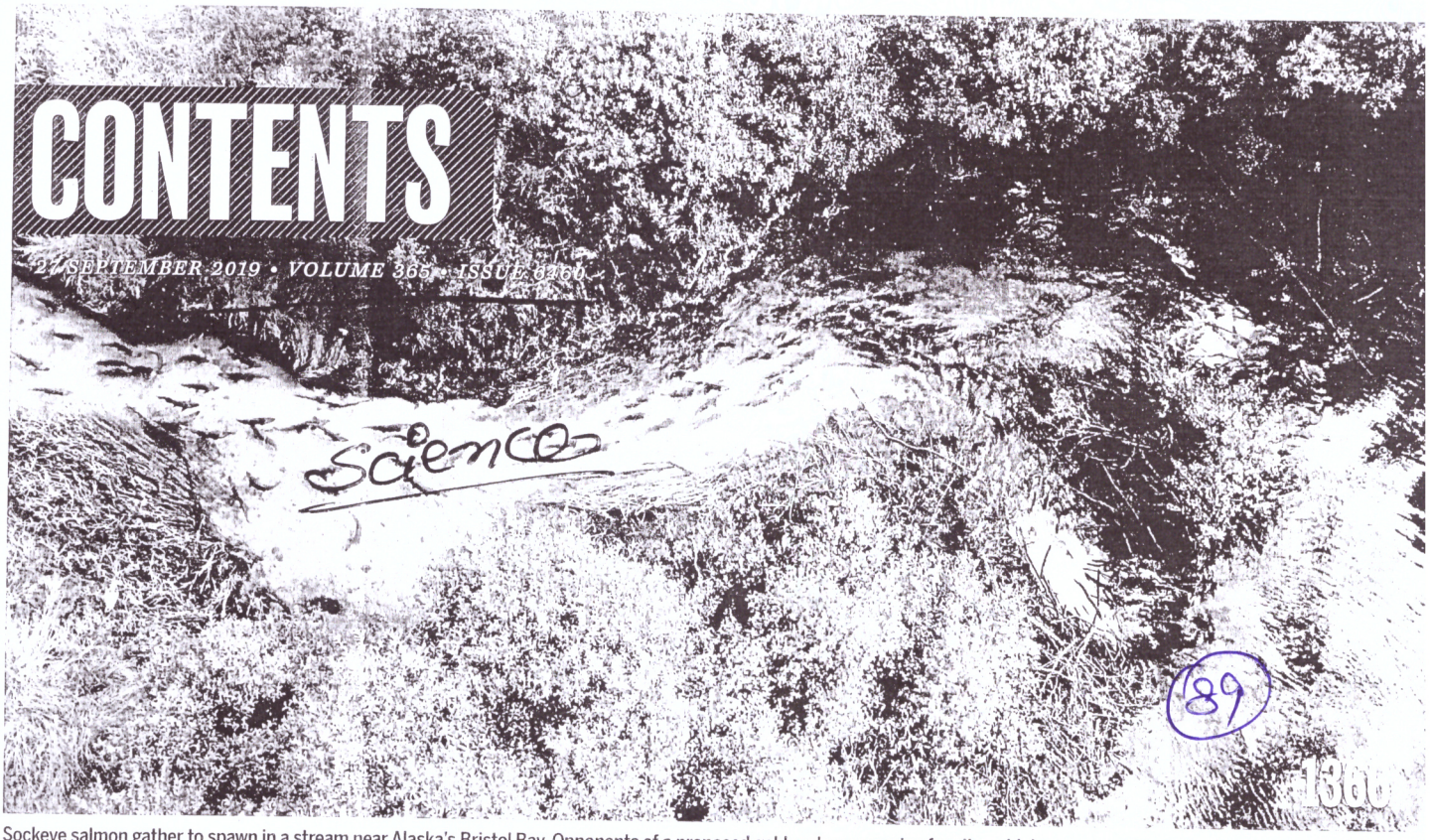

Sockeye salmon gather to spawn in a stream near Alaska's Bristol Bay. Opponents of a proposed gold and copper mine fear it could damage a world-class salmon fishery.

PHOTO: JASON CHING

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Genes present a blueprint directing molecular machinery to create an adult human, but phenotype also depends on environmental factors. Shown are genetically distinct individuals (highlighted) shadowed by other phenotypes they may have displayed under different developmental conditions. This special issue examines the complexity of translating genotype to phenotype, including how varied environments may affect the developing phenotype. See page 1394.
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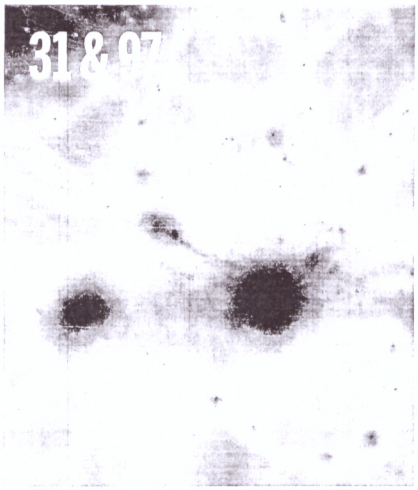

Galaxies (colors) and hard-to-detect gas filaments (blue) observed with telescopes

IMAGE: HIDEKI UMEHATA

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Human beings are social animals, and language is central to our existence. Both the large human brain and the language it enables have influenced our lives, but which has more effectively shaped the world around us? This special issue highlights some recent insights into the evolution of language, the brain structures involved in the production and interpretation of language, and how this flexible function creates meaning. See page 48. *Illustration: Eiko Ojala*

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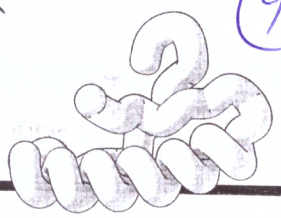

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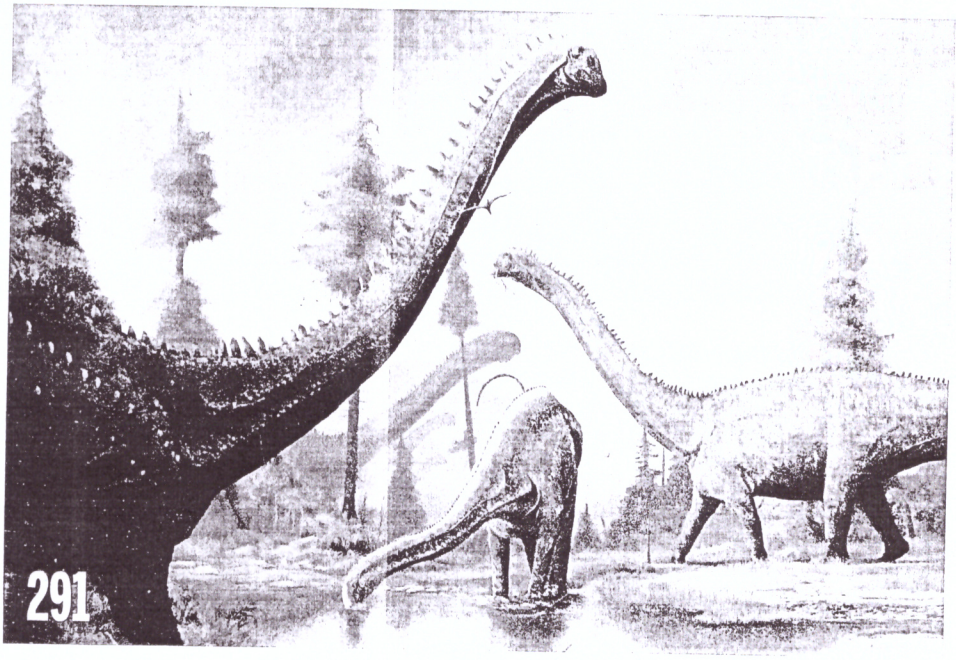

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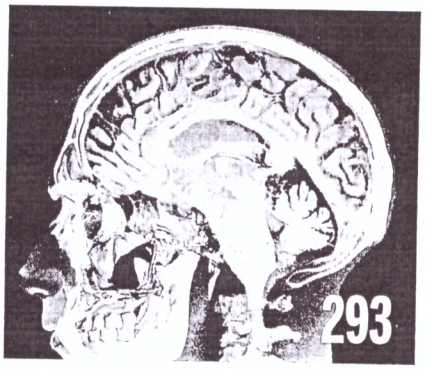

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ILLUSTRATION: MARK WILTON; PHOTO: ZEPHYR/SCIENCE PHOTO LIBRARY/GETTY IMAGES

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A colony of the protozoan species *Choanoeca flexa*. As a choanoflagellate, *C. flexa* is one of the closest living relatives of animals. This species forms cup-shaped colonies that quickly invert their curvature in response to light-to-dark transitions by undergoing collective cell contractions. This behavior may offer insight into the evolutionary origin of tissue bending in animals. See pages 300 and 326. *Image: Thibaut Brunet (University of California Berkeley/Howard Hughes Medical Institute)*

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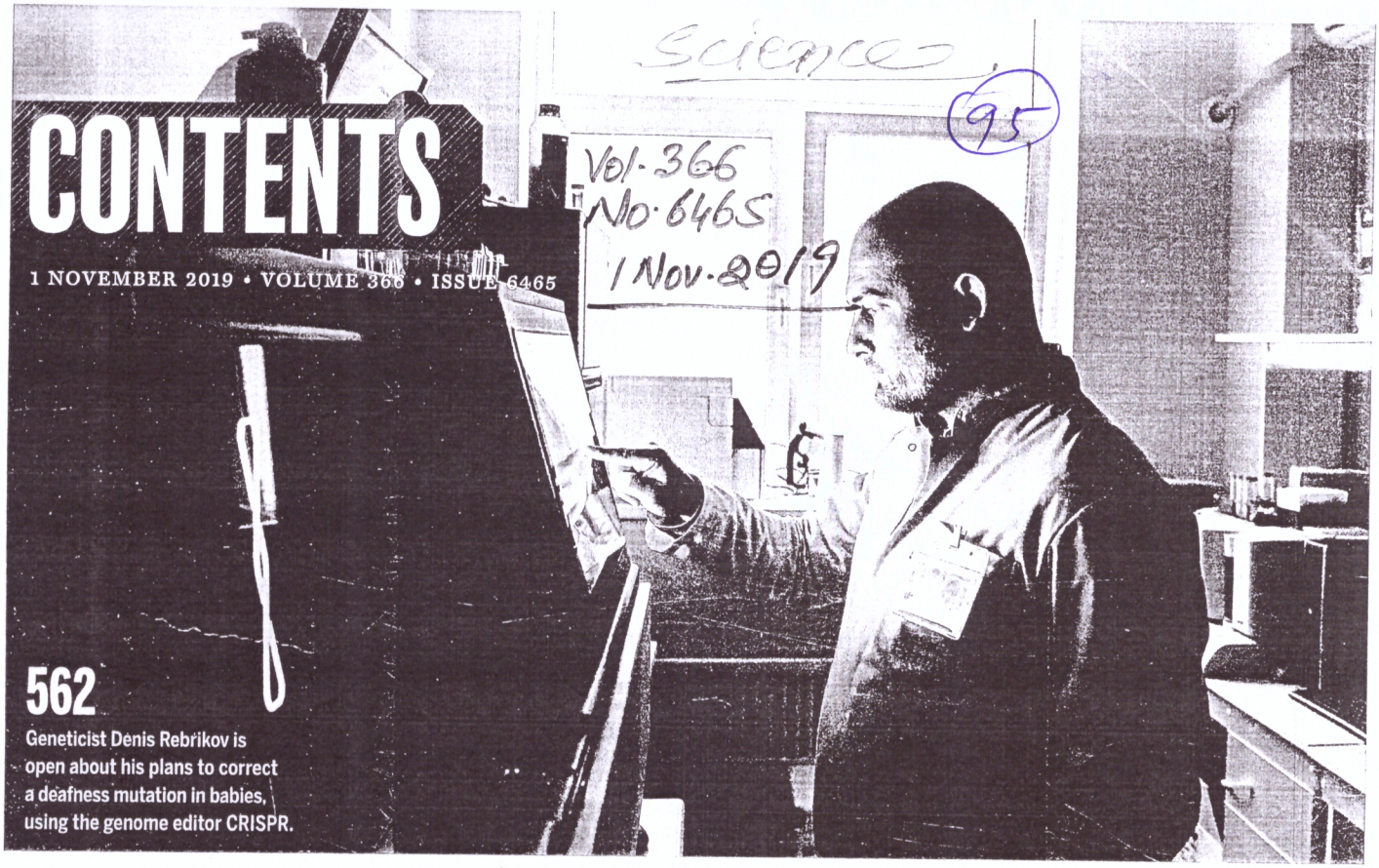

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Heliconius melpomene (left) and *H. erato* (right) gained protection from predators by evolving similar warning colors, an example of Müllerian mimicry. These species are among 20 sequenced butterfly genomes that illustrate the importance of hybridization and gene flow in genomic evolution. See pages 570 and 594.
Photo: Andrew Neild

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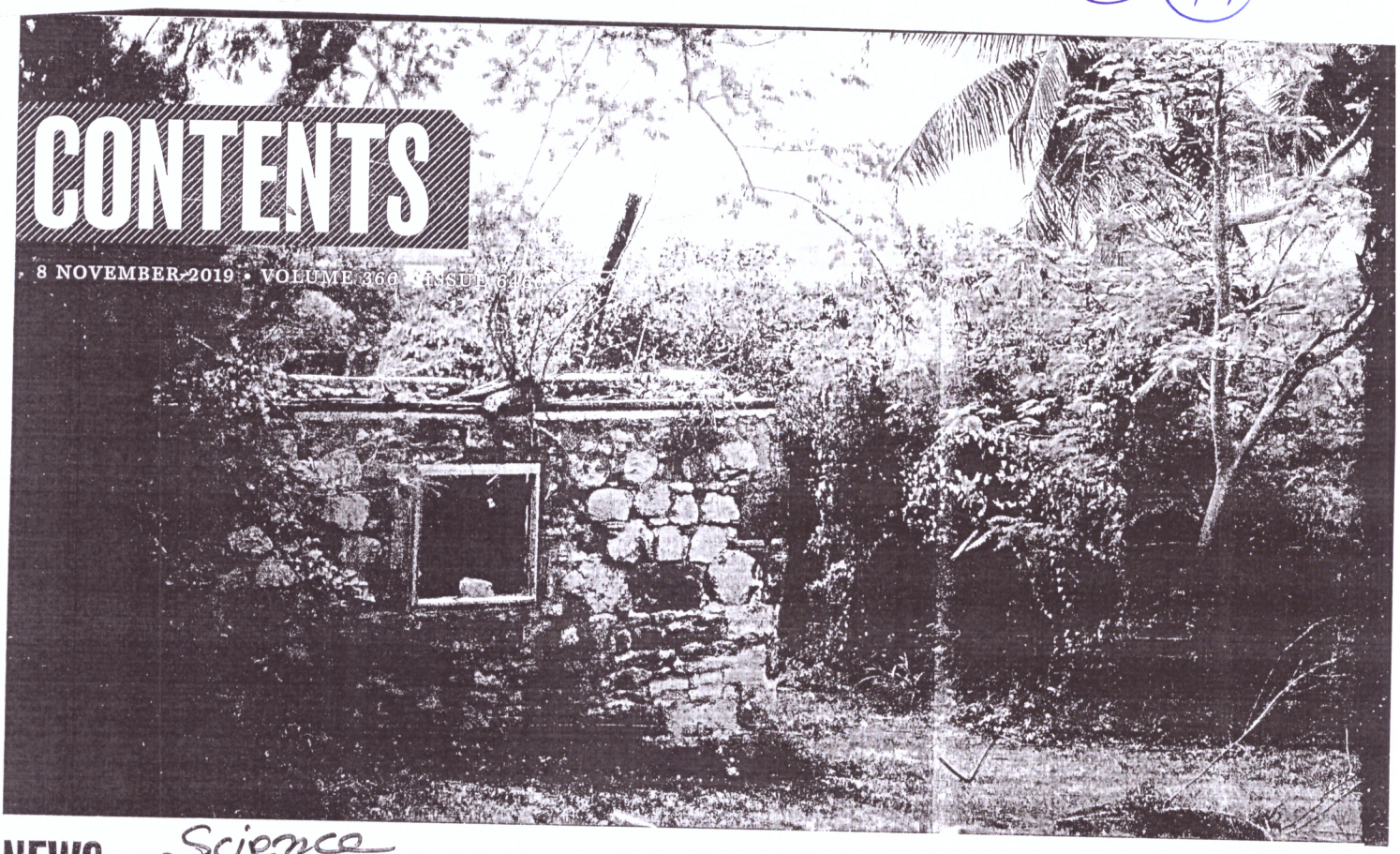

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Time-lapse image of the Roman Colosseum, which symbolizes the power and durability of Rome—one of the largest cities of the ancient world and seat of an empire of ~70 million people. A sample of ancient genomes spanning 12,000 years reveals that, from ~3000 years ago on, Rome had a population of diverse ancestries. Rapid genetic shifts in historical time reflect movements of people as Rome's political connections and trade networks changed. See pages 673 and 708.
Credit: Mark Bassett/Alamy Stock Photo

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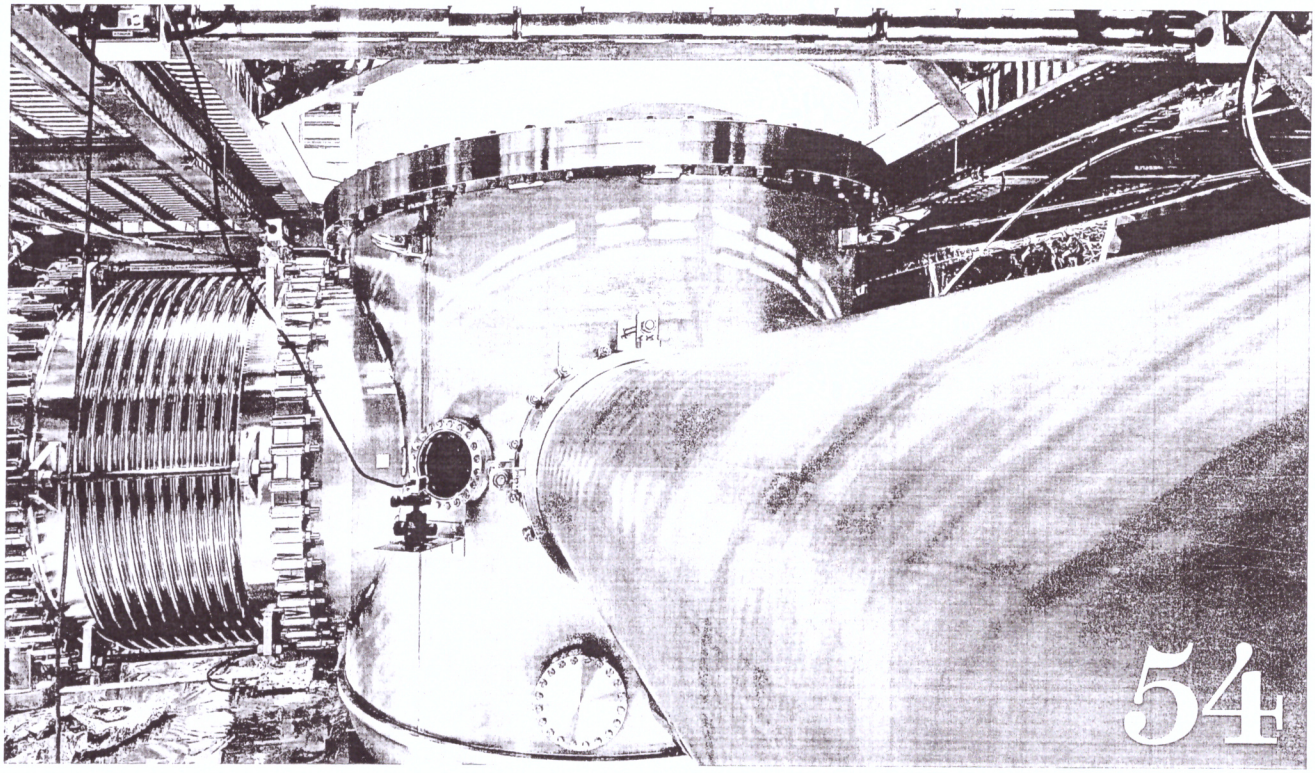

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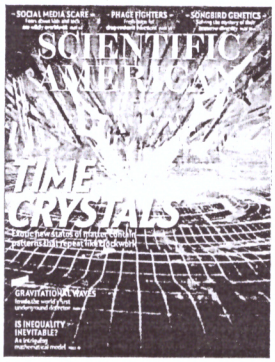

ON THE COVER
Physicists recently discovered the first real-world time crystals, states of matter in which patterns repeat over time. Materials of this kind could be used in new, ultra-accurate clocks, and the study of time crystals in general could lead to insights in fundamental physics and cosmology.
Illustration by Mark Ross Studio.

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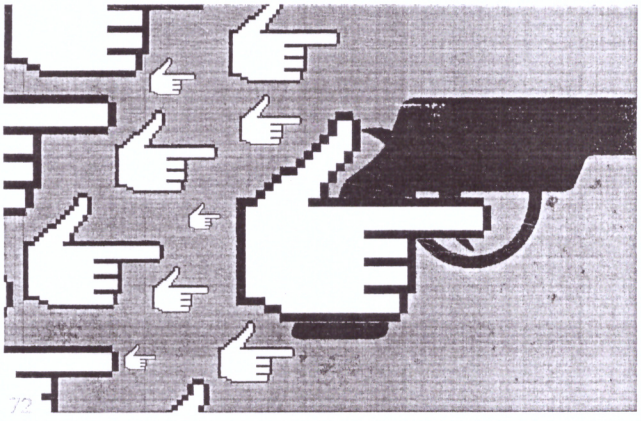

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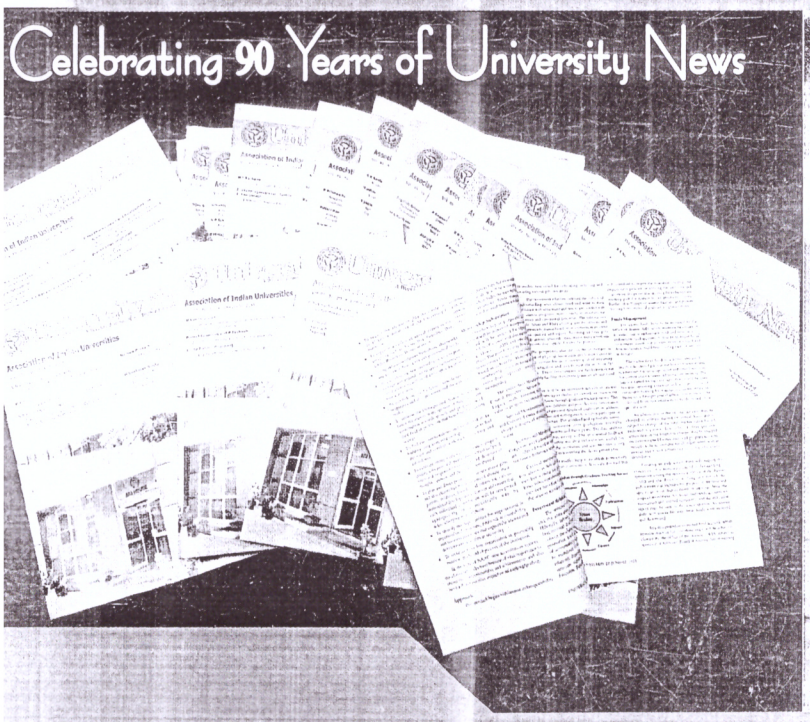



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Machine Learning: Driving Insights from Artificial Intelligence

Puneet Goswami* and P Parkash**

For many centuries, one of the goals of Mankind has been to develop machines. We envisioned these machines as performing all cumbersome and tedious tasks so that we might enjoy a fruitful life. The era of machine making began with the discovery of simple machines such as lever, wheel and Pulley. Many equal congenial inventions followed thereafter. Nowadays engineers and scientists are trying to develop intelligent machines. The advancement in the field of technology impacted human and made them an inevitable dependent on computer systems. As a result, developing and deploying quality software in systems becomes more vital. With the sequence of time, modelling and designing of software have immensely transformed. This transformation results in the Artificial Intelligence evolution. Overtime, Artificial Intelligence (AI) has shifted from algorithms that rely on programmed rules and logic instincts to machine learning, where algorithms contain few rules and ingest training data to learn by trial and error. Failures are a very common occurrence in the Aviation and Logistics industries. It is very critical to such an extent that we cannot afford failures to happen at any point in time given that there is a lot at stake. This is where machine learning comes into place. Predictive maintenance is a stream in Machine Learning where the machine is capable of predicting failures based on the historical occurrence of failures. Thus, failures can be predicted before they could even occur rather than doing an analysis and correction.

Artificial neural systems development or Artificial Intelligence has an amazing background. Since it is not possible to cover this background in depth in short introductory review article, only major achievements are included. The glimpse at the machine learning field's past milestones should provide the reader with an appreciation of how contribution to the field have led to its development over the years.

Donald Hebb (1949) first proposed a learning scheme for updating neuron's connections that we now refer to as the Hebbian Learning Rule. During the 1950s the first neuro computers were built and tested (Minsky 1954). They adapted connections automatically and the neuron like element called perceptron was invented by Frank Rosenblatt in 1958.It was a trainable machine capable of learning to classify certain patterns by modifying connections to the threshold elements(Rosenblatt 1958).The idea caught the imagination of engineers and scientists and laid the groundwork for the basic machine learning algorithms that we still use today.

In the early 1960s a device called ADALINE (for ADAptive LINEar

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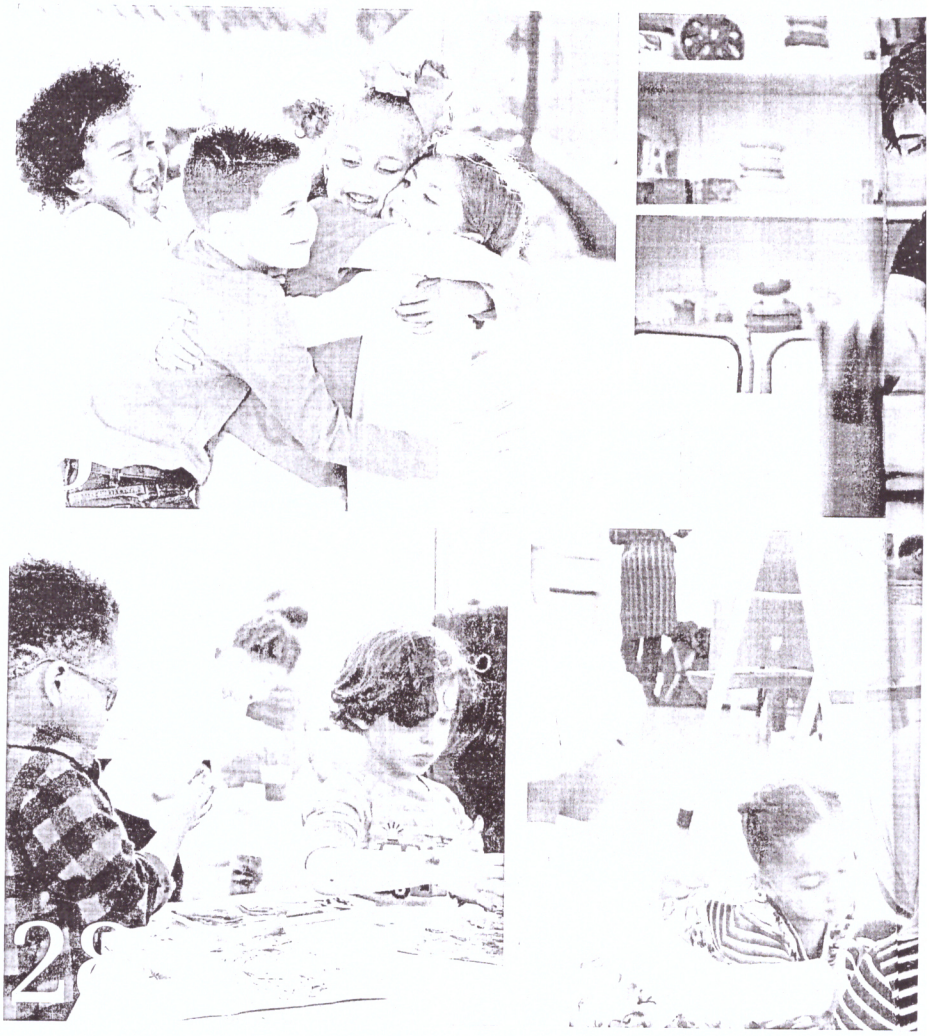

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