

**Howard E. Michel, WB2ITX**Publisher

Steve Ford, WB8IMY Editor

Becky R. Schoenfeld, W1BXY Managing Editor

Jen Glifort, KC1KNL Senior Editor

Caroline Kenney Leanna Zwiebel Assistant Editors

Bart Jahnke, W9JJ Radiosport & Field Services Manager

Rick Lindquist, WW1ME Happenings

Bob Allison, WB1GCM Product Review Lab Testing

Mark J. Wilson, K1RO
Al Brogdon, W1AB
Bernie McClenny, W3UR
H. Ward Silver, NØAX
Paul Wade, W1GHZ
Jon Jones, NØJK
Rick Palm, K1CE
Joel R. Hallas, W1ZR
Barry Shackleford, W6YE
Kai Siwiak, KE4PT
Bruce Draper, AA5B
Contributing Editors

Michelle Bloom, WB1ENT Production Supervisor

Jodi Morin, KA1JPA Assistant Production Supervisor

Maty Weinberg, KB1EIB Production Coordinator

Sue Fagan, KB10KW Graphic Design Supervisor

David Pingree, N1NAS Senior Technical Illustrator

Janet Rocco, W1JLR Advertising Sales Manager

**Bob Inderbitzen, NQ1R** Product Development Manager

Yvette Vinci, KC1AIM Marketing and Sales Manager

Diane Szlachetka, KB1OKV Advertising Graphics Designer

**Steve Ewald, WV1X**Field Organization Supervisor

Eric Casey, KC2ERC
Convention and Event Coordinator

# **Contents**

January 2020 ◆ Volume 104 ◆ Number 1

9 Second Century
Dare to Imagine

Constructing Metal Enclosures
Robert Miller, KE6F

Untangling the Decibel Dilemma
H. Ward Silver, NØAX

Comparing Mobile/Portable Antennas on 20 Meters
Ulrich Rohde, N1UL

Product Review
Mark Wilson, K1RO
Icom IC-9700 VHF/UHF Multimode
Transceiver; N6BT V-8 Vertical Dipole
for 80 – 10 Meters; mAT-Tuner mAT-125E
Automatic Antenna Tuner



Nashua Area Radio Society Outreach to New Hams
Fred Kemmerer, AB10C

ARISS's Next Generation Radio System Progresses
Toward Launch
Joe Lynch, N6CL

73 The ARRL Ham Radio Equipment Insurance Plan Jen Glifort, KC1KNL

The Winter ARRL School Club Roundup

Hiram Percy Maxim 150th Birthday Celebration Results
Paul Bourque, N1SFE

93 A Look Back: March 1970



### Columns

Amateur Radio World	77
Celebrating Our Legacy	99
Classic Radio	100
Contest Corral	81
Correspondence	24
The Doctor is In	56
Eclectic Technology	63
Exam Info	80
Happenings	74
Hints & Hacks	64
How's DX?	86
Member Spotlight	13
Microwavelengths	58
Public Service	78
Technical Correspondence	60
Up Front	20
The World Above 50 MHz	88
100, 50, and 25 Years Ago	102

## **Digital and Mobile Editions**

ARRL members can access the digital edition via a link at www.arrl.org/qst, download our iOS app from the iTunes Store, and download our Android app from the Google Play Store.

## **Departments**

ARRL Section Managers	16
Certificate of Code	
Proficiency Recipients	90
Convention and Hamfest Calendar	84
Feedback	62
Field Organization Reports	
Guide to ARRL Member Benefits	14
Ham Ads	140
Index of Advertisers142,	143
New Products	
Officers, Division Directors, and Staff	
QST Cover Plaque Award	
QuickStats	
Silent Keys	
Special Event Stations	
Strays	
This Month in <i>QEX</i>	
W1AW Qualifying Runs	_
W1AW Schedule	
W1AW's QSL File	92

## Write for QST

www.arrl.org/qst-author-guide email: qst@arrl.org



#### Our Cover

Intrepid portable operator Jerry Clement, VE6AB, took this photo west of Calgary, Alberta, Canada on a ridge in Kananaskis Country bordering the Alberta Rockies. Jerry built this 10 – 40 meter magnetic loop antenna (MLA). The antenna and its mount were designed to sit on the pack-frame, along with the radio. The MLA breaks down for storage on the pack-frame when not in use. Jerry said, "On this day with good band conditions on 20 meters, I was working [US] stations located south of my location." [Jerry Clement, VE6AB, photo]









QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, Inc, 225 Main St., Newington, CT 06111-1400, USA. Periodicals postage paid at Hartford, CT, USA and at additional mailing offices.

POSTMASTER: Send address changes to: QST, 225 Main St., Newington, CT 06111-1400, USA. Canada Post: Publications Mail Agreement #90-0901437. Canada returns to be sent to IMEX Global Solutions, 1501 Morse Ave., Elk Grove Village, IL 60007.

US & Possessions: Membership in the ARRL, including a 1-year subscription to QST, is available to individuals at \$49. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of \$25. Life Membership, including a subscription to QST is available at \$1,225.\* Membership includes \$21 per year for subscription to QST. Membership and QST cannot be separated. Libraries and institutions, \$49 per year. Single copies \$6.95.

#### International

To compensate for additional postage for mailing outside the US, the following rates apply:

Canada: Membership in the ARRL, including a 1-year subscription to *QST*, \$62, payable in US funds. Life Membership, including a subscription to *QST* is available at \$1,550.\* Libraries and institutions, \$62 per year.

All Other Countries: Membership in the ARRL, including a 1-year subscription to QST, \$76, payable in US funds. Life Membership, including a subscription to QST, is available at \$1,900.\* Libraries and institutions, \$76 per year.

Membership without *QST* is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for \$10 per year.

Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

Membership in the ARRL, including a 1-year subscription to Digital *QST* only, is available to Canadian and International members at

Copyright © 2019 by the American Radio Relay League Inc. Title registered at the US Patent Office. International copyright secured. All rights reserved. Quedan reservados todos los derechos. Printed in the USA.

OST®, DXCC®, VUCC®, DX Century Club®, ARES®, Amateur Radio Emergency Service®, Logbook of The World®, LoTW®, and ARRL, the national association for Amateur Radio® are registered trademarks of the American Radio Relay League, Inc.

The ARRL and QST in no way warrant the products described or reviewed herein.

QST is available to blind and physically handicapped individuals from the Library of Congress, National Library Service for the Blind and Physically Handicapped. Call 1-800-424-8567 or go to www.loc.gov/nls/.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421

\*Payment arrangements available. Please write for details.

In order to ensure prompt delivery, we ask that you periodically check the address information on your mailing label. If you find any inaccuracies, please contact the Circulation Department at circulation@arrl.org or 860-594-200 immediately. Thank you for your assistance.

Reprints and permissions: permission@arrl.org

Details of our Online Privacy Policy
can be found at

www.arrl.org/online-privacy-policy.

Telephone: **860-594-0200** Fax: **860-594-0259**