

**Barry J. Shelley, N1VXY**  
Publisher

**Steve Ford, WB8IMY**  
Editor

**Becky R. Schoenfeld, W1BXY**  
Managing Editor

**Jen Gilfort, KC1KNL**  
Senior Editor

**Caroline Kenney**  
**Meghan Reilly**  
**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, N0AX**  
**Paul Wade, W1GHZ**  
**Jon Jones, N0JK**  
**Rick Palm, K1CE**  
**Joel R. Hallas, W1ZR**  
**Barry Shackelford, 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

**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

**Steve Ewald, WV1X**  
Field Organization Supervisor

**Eric Casey, KC2ERC**  
Convention and Event Coordinator

## 9 Second Century

Radio and the Ecosystem of Innovation

## 30 Program an Arduino to Transmit WSPR

Anthony Le Cren, F4GOH/KB1GOH

## 34 Antenna Performance in a Forest of Trees

Steve Stearns, K6OIK

## 38 The Rooster-Tenna — A 2-Meter Weathervane Antenna

John Portune, W6NBC

## 43 Product Review

Mark Wilson, K1RO

Butane-Powered Soldering Tools; Hy  
Power Antenna Company TRI1020  
Triband Dipole; AlexLoop Premier  
40 – 10 Meter Magnetic Loop  
Antenna with AlexTune



## 56 Operating from Tillamook Rock

Cezar Trifu, VE3LYC

## 59 A Tale of Two Catches

Lawrence Paola, KC2EQA

## 61 Bicycle Mobile on the HF Bands

Christian Bravo, W4ALF

## 70 2020 ARRL RTTY Roundup Results

Jeff Stai, WK6I

## 72 2020 ARRL International DX CW Contest Results

Mark Beckwith, N5OT

## 74 The 2020 ARRL September VHF Contest

## 74 The 2020 ARRL 10 GHz and Up Contest

## 75 The 2020 ARRL International EME Competition

## 85 A Look Back — October 1970

## Columns

At the Foundation .....	81
Celebrating Our Legacy.....	91
Classic Radio.....	92
Contest Corral .....	69
Correspondence .....	24
The Doctor is In .....	51
Eclectic Technology .....	53
Happenings .....	63
Hints & Hacks .....	54
How's DX? .....	76
Member Spotlight .....	13
Public Service .....	67
The World Above 50 MHz.....	78
Up Front.....	20
100, 50, and 25 Years Ago.....	94

## Digital and Mobile Editions

ARRL members can access the digital edition via a link at [www.arrl.org/qst](http://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 .....	82
Convention and Hamfest Calendar.....	83
Feedback.....	75
Field Organization Reports.....	68
Guide to ARRL Member Benefits .....	14
Ham Ads.....	124
Index of Advertisers.....	126, 127
New Products .....	75
Officers, Division Directors, and Staff.....	15
QST Cover Plaque Award.....	60
Silent Keys.....	95
Special Event Stations.....	80
Strays.....	55, 84, 93
This Month in QEX .....	42
W1AW Qualifying Runs .....	82
W1AW Schedule.....	28

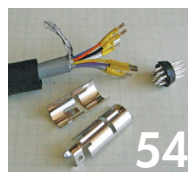
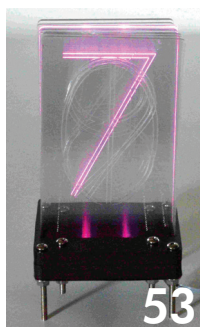
## Write for QST

[www.arrl.org/qst-author-guide](http://www.arrl.org/qst-author-guide)  
email: [qst@arrl.org](mailto:qst@arrl.org)



## Our Cover

Tillamook Rock is located in “the Graveyard of the Pacific,” a few kilometers off the coast of Oregon. This rare IOTA location features a plethora of wildlife, including a large sea lion population. Read all about the K7TRI DXpedition to this stormy area in Cezar Trifu’s, VE3LYC, article, “Operating from Tillamook Rock,” on page 56 of this issue.



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 \$49.

Copyright © 2020 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.

QST®, 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/](http://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](mailto:circulation@arrl.org) or 860-594-0200 immediately. Thank you for your assistance.

Reprints and permissions: [permission@arrl.org](mailto:permission@arrl.org)

Details of our Online Privacy Policy can be found at [www.arrl.org/online-privacy-policy](http://www.arrl.org/online-privacy-policy).

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