

EXPERIMENTAL MUSICAL INSTRUMENTS

SYNOPSIS OF ARTICLES

FOR THE COMPLETE SET OF 70 ISSUES,
JUNE 1985 THROUGH JUNE 1999



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VOLUME 1 #1, JUNE 1985

“What This Is About: Our Purpose and Our Plans” by Bart Hopkin. 1/2 page; no photos.

A brief statement of the goals and purview of Experimental Musical Instruments by its the author and publisher. [Additional keywords: EMI, newsletter, sound sources]

“Lyra” by Bart Hopkin. 1 page; 1 drawing

French designer and builder Pierre-Jean Croset’s eighteen-string instrument is made of clear plastic and played entirely in harmonics. Conventional strings lack sufficiently exact tolerances for Croset’s just tuning because of irregularities in diameter and mass. [Additional Keywords: open strings, nodes, just intonation, resonant materials, guitar pickups, intervals, just intonation]

“Steel Cello and Bow Chimes” by Bart Hopkin. 2 pages; 2 drawings.

Designed by and built by Berlin-born Painter and sculptor Robert Rutman, the Single-String Steel Cello uses a suspended and flexible steel sheet that projects pitches ranging from low pitches to high, sounding harmonics and fundamental equally. The curved steel resonator of the Bow Chimes imparts an ethereal to the attached steel rods. [Additional Keywords: thunder, bowed metal, Tibetan chants, U.S. Steel Cello Ensemble]

“Tools and Techniques” by Bart Hopkin. 4+ pages; 5 drawings.

Tuning Devices: gives a rundown of the different types of tuning aids available, how they are used, what they cost, and where to purchase them. [Additional Keywords: pitch pipes, tuning forks, electronic audio tuners, strobe tuners, cycles per second, frequency, tonometers, overtones, beating.]

“Organizations & Periodicals”. 2 pages

A Reference Guide to 17 useful associations, foundations, journals, festivals, and societies relating to new instruments, their performance, history, and research.

“Books”. 1 page; 2 drawings.

Tony Pizzo of Vermont writes about his forthcoming book of instrument designs tentatively titled *The Maker-Played Instrument*. (Note: This book was later cancelled by the publisher and never published.) The designs are primarily adaptations of South American, African, and Asian string and percussion instruments.

British organologist Hugh Davies of London reports that the three volumes of *The New Grove Dictionary of Musical Instruments* includes over 300 entries on 20th century instruments, mostly written by himself. [Additional Keywords: materials, koras, gopichands, stick zithers, bulbul tarangs.]

“Voice Modifiers”:. 1/2 page.

A call for information on instruments that alter or enhance human vocal sounds, such as mirlitons, kazoos, zobos, face-masks, or Eskimo children’s games using the oral cavities.]

“A New Instrument at the Exploratorium—The Pentaphone”: by Bart Hopkin. 1/2 page.

A brief description of Jonathan Glasier’s new instrument using five sets of tuned bars, made of paduk, bamboo, magnesium, aluminum, and travertine marble. Similar to Harry Partch’s instruments for its geometric beauty, it is tuned to a pentatonic scale, uses a symbolic system of shapes and colors to express pitch relationships, and is housed in a Pagoda-like structure in San Francisco’s Exploratorium science center. [Additional Keywords: marimbas, exhibits, museums]

VOLUME 1 #2, AUGUST 1985

“Letters” 2 pages; 2 diagrams.

Dagen Julty describes his technique for amplifying low-volume sound in a high volume stage environment with his invention named the “Micro-Sensitive Sound Chamber.” References are made to a Lief Brush interview in *Musicworks* magazine and the work of Tom Nunn and Prent Rodgers in California. A diagram details how the sound string and turnbuckle are anchored to the sheet metal resonator of Robert Rutman’s Steel Cello. Jordan Hemphill describes a voice modifier in his discovery of a Chinese flute with rice paper mirliton. [Additional Keywords: string tensioning, buzztones, microsonics]

“Sharon Rowell’s Clay Ocarinas” by Sharon Rowell. 4 pages; 12 drawings and diagrams.

An introduction by Bart Hopkin precedes Rowell’s article describing the principles and personal benefits of playing ceramic ocarinas, also known as vessel flutes. Rowell explains her construction methods. Her detailed article is a step-by-step demonstration of how she constructs and fits a fipple mouthpiece so that three chambers can be played at once. Noting that clay shrinks in drying and firing, it is difficult to have perfectly pitched instruments. She describes how the toneholes are sized and placed. Scales and tuning employ a pennywhistle fingering system. A sidebar lists other vessel flute makers. [Additional Keywords: ceramics, chambers, fingering charts, globular flutes, recorders, edge tones]

“The Long String Instrument”: by Bart Hopkin. 2 pages; 2 photos, 1 table, 2 diagrams.

An explanation of the physics of longitudinal vibrations in strings, which are operative in the sound of Ellen Fullman’s Long String Instrument. A table gives formulas for determining the velocity of waves traveling through wires of various lengths and metals. The design of the soundboard and attached string, as well as the tuning mechanism are described and illustrated in the diagrams. Playing techniques, tuning, and timbre, and resulting music are also described. [Additional Keywords: frequency, frequencies, velocities, iron, bronze, brass, installations, tunings, intervals, harmonies, overtones, fundamentals]

“Ellen Fullman Writes About the Evolution of the Long String

Instrument" by Ellen Fullman. 1 page.

Ms. Fullman's personal account describes a chance discovery and the ensuing process of research and experimentation. Several years of development involved self-directed study in the science of musical acoustics. Engineers showed her how to amplify the sound without a contact microphone and electronics, to lower the frequency, and to increase sustain through the use of brass wire and a resonating box. David Weinstein taught her about just intonation and she eventually developed charts for seeing the mathematical relationships in her tunings. [Additional Keywords: ancient tunings, chromatic, scales, installations]

"Recent Events". 1+ pages, 2 drawings.

Sound Wave Festival: a review of this outdoor sound festival held at Candlestick Point State Recreation Area near San Francisco, in May 1985. Bill and Mary Buchen led students in the creation of many types of instruments that were played. "The Wind Antenna," an aeolian harp built by the Buchens, was one permanent installation. Also performing were Chris Brown, Tom Nunn, and William Wynant. [Additional Keywords: community, Environmental Sculpture Project, wind harps, Fish Marimba, Gazamba, Wavicle, Crustacean]

"Voice Modifiers Follow-up". 1/4 page.

Members of Logos Foundation in Belgium described a metal voice resonator they built in an interview in Musicworks. Tom Nunn, Crustacean, a balloon-mounted instrument with bowed metal rods, also responds to the voice. [Additional Keywords: coil springs, mirlitons, vocals]

Book Reviews. 1/2 page.

Two books by Emil Richards catalogue his varied and wonderful collection of fascinating percussion instruments and effects: *Emil Richards "World of Percussion,"* and *Range Finder For the Percussion Seeker: A List of Six Hundred Percussion Instruments.* [Additional Keywords: sound tracks, drums]

Organizations and Periodicals. 1/2 page.

The American Musical Instrument Society (AMIS) is an "international organization founded in 1971 to promote the study of the history, design and use of musical instruments in all cultures and from all periods." The society also produces a scholarly journal and a smaller newsletter. [Additional Keywords: Galpin Society]

VOLUME I #3, OCTOBER 1985

"Letters" 1 & 1/2 pages.

A short note by Arthur H. Sanders from The Musical Museum offers information on the Reed Organ Society. Bill Colvig, in response to the June 1985 article on tuning devices, tells where he found WW II surplus oscilloscopes and kits. Bill and Mary Buchen give an update on recent activities. [Additional keywords: relative tuning, frequency-to-cents charts, Lou Harrison, Heathkit, flea markets, Marie Osmond, Skip La Plante, Bow Gamelan

Ensemble, Ripley's Believe It Or Not]

"The Puget Sound Wind Harp" by Bart Hopkin. 3 pages. 3 drawings.

Ron Konzak's massive aeolian harp is described, with attention to exceptional requirements of its design, construction and tuning: fundamental tones are subsonic and the acoustic behaviors of flat stainless steel banding versus round strings are discussed. Contact for Konzak, his recording of the instrument, and his own written account are provided along with information about other wind harps. [Additional keywords: overtones, resonating chambers, torsional waves, flat ribbons, ribbon strings]

"Glenn Branca and The Third Bridge" by Bart Hopkin. 1 1/2 pages. 1 diagram.

New York composer noted for his electric guitar symphonies, Branca's harmonics guitar is designed to selectively produce the tones of the harmonic series, enabling the series to be used for scale material. The article details how the strings, the pickup and a central bridge are uniquely positioned to bring out the string harmonics. A sidebar compares conventional harmonics playing to Branca's extended technique. [Additional keywords: nodes, octaves, guitar pickups, sliding bridges]

"Meet Mothra" by Tom Nunn. 2 pages; 2 photos.

Nunn's electroacoustic percussion board is made from birch plywood, steel rods, combs, springs, glass, and self-adhesive sidewalk safety surfaces, which are amplified with a contact microphone. This San Francisco composer and builder's basic playing techniques on Mothra are striking, strumming, plucking, scraping, rubbing, and bowing. He describes the construction materials, its visual aesthetic, and possibilities for future exploration; his concepts and history in free improvisation, spontaneous interactive processes, teaching, and the Bay Area Improvisational Project. [Additional keywords: Sound Wave Festival, found objects, non-musicians, Earwarg,]

"Some Thoughts on Sound Art Exhibits" by Peter Williams Brown. 1 & 1/4 pages; 1 photo.

Brown shares some of his findings and solutions to the problems of presenting gallery-based sound exhibitions: continuous background noise levels, displaying hands-on installations, dividing space into small rooms, "tokenism," audience interaction, volume control mechanisms, his "music box" approach, and their advantages and drawbacks. [Additional keywords: audio arts, participation, curating, sound sculptures, baffles, All Ears]

"Organizations and Periodicals". 3/4 page.

Information on The Guild of American Luthiers: journal, history, membership, convention and contact. Over 200 Data Sheets of their quarterly journal provide an utterly unique library of practical and esoteric information. [Additional keywords: associations, string instruments, guitars, Tacoma]

"Books". 1 page.

Marlin Halverson's *Sonic Art* exhibition catalog was published for

the Sonic Art Exhibition at the Art Gallery at California State College in San Bernardino, 1982. The usefulness and difficulty in acquiring catalogs of contemporary sound art exhibits is discussed. The Sonic Art exhibit is described. [Additional keywords: catalogues, audio arts, curating, sound sculptures]

“Events”. 1 page.

Review of performances by Totem, a group led by Richard Waters, inventor of the Waterphone, and Nazim Ozel, a classically trained Turkish master of the Ney flute, who performs on his Semi-Civilized Tree. These were part of a concert series at the Theater Artaud, sponsored by the Maitreya Institute of San Francisco. [Additional keywords: tree branches, water, Turkish music, natural materials]

VOLUME 1 #4, DECEMBER 1985

“Letters” 3/4 page.

Additional information on making the rectangular soundboard used in Ellen Fulman’s Long String Instrument described in EMI Volume 1 #2. [Additional keywords: soundboards, resonators]

“The Bi-Level Guitar” by David F. Marriott, Intro. by Bart Hopkin. 3 pages; 3 photos, 1 diagram.

New curved soundboard design for the acoustic guitar results in louder sound with more evenly distributed overtones. A Fast Fourier Transform (FFT) Spectral Analysis Program shows how the increased partials produce a sensation of brilliancy. Lab tests and modification of the guitar’s conventional structural properties to improve its articulation, timbre, sustain, and balance are described. [Additional keywords: classical guitars, envelopes, heat bending machines, struts, bracing, necks, fretboards, La Jolla Luthiers]

“Slit Drums and Boos” by Bart Hopkin. 2 pages, 2 drawings. Wooden drums and their tuning problems: destructive communication between vibrations, e.g., “conflicting” notes, is addressed with various solutions provided. Jon Scoville and Reinhold Banek’s book, *Sound Designs*, is cited for other simple and practical variations of the slit drum. (Note: this article overstates the difficulties in tuning many-tongued tongue drums — take its pronouncements with a grain of salt.) [Additional keywords: log drums, wooden tongues, nail violins, tongue drums]

“Holy Crustacean, Batman, That Beast Sings!” by Tom Nunn. 1 1/2 pages; 1 photo.

Nunn’s Crustacean is a stainless steel disk with curved bronze rods brazed to its surface, and is supported on three inflated balloons. It is also effective for resonating a player’s own voice. Nunn briefly describes his playing technique, its construction and use in performances with Chris Brown in San Francisco. [Additional keywords: bowed metal, bowed idiophones, sympathetic vibrations]

“Musical Instrument Classification Systems” by Bart Hopkin. 3 pages; 1 diagram.

A brief history and overview of a system devised by Curt Sachs and Erich M. von Hornbostel in 1914 to address the inconsistencies in criteria for classifying instruments. A full-page chart illustrates the Sachs-Hornbostel System which is divided into four basic categories. A sidebar mentions three other more recent systems, reference titles, and also the classical Chinese system. [Additional keywords: museum curators, collectors, taxonomies, theory, organology]

“Books: A Selected Guide for Reference Works Related to New Instruments” by Bart Hopkin. 1 & 1/2 pages.

Listing of thirteen books in four categories: General, New Instruments, Musical Acoustics, and Tuning Systems. [Additional keywords: research, publications, libraries, dictionaries, education, encyclopedia, surveys, how-to, theory]

VOLUME 1 #5, FEBRUARY 1985

“Letters” 1 & 1/4 pages

Charles R. Adams on Hugo Zemp’s musical instrument classification system (Volume I #4) based in the meaning of ancient Greek, Roman, and Indian words, with reference list of books by Ernest G. McClain. A counterpoint from Stephen Smith to Bart Hopkin’s article (Volume I #4) on the tuning problems of wooden slit drums. [Additional keywords: Sanskrit, tuning systems, tongues, tongue drums, organology, ethnomusicology, Pythagorean, Plato]

“Wind, Breath and strings Round and Flat” by Charles R. Adams. 3 & 1/2 pages; 4 photos, 4 drawings.

Discussion of the Lesiba of southern Africa, an air-activated zither variously known as the gora, ugwala, or makwindi, and its culture. The article details and illustrates its construction: a stick, string, and quill; similar to bullroarers and aeolian harps, and its playing technique. A bibliography and discography is provided. [Additional keywords: John Blacking, Ron Konzak’s wind harp, feathers, ribbon-reed aerophones, mouth bows, mouth harps, jews-harps, somatophones]

“Organizations and Periodicals: Conference of Intervallic Music”. 1 page.

Interval Foundation was founded by Jonathon Glasier in San Diego. *Interval: Journal of Music Research and Development* is a quarterly publication concerned with intonational systems and creative work in the field of microtonal music. (*Interval Magazine* has since ceased publication.) [Additional keywords: Harry Partch, microtonality, new instrument resources]

“Disorderly Tumbling Forth” by Bart Hopkin. 4 pages; 2 photos, 6 drawings.

Tuned idiophone designed and built by Bart Hopkin uses copper tube chimes. Versions include a keyboard action design similar

to a harmonium, and a tabletop model. Tuning and materials are detailed in text and illustrations.

“Tools and Techniques: Calculating Frequencies for Equal Tempered Scales” by Bart Hopkin. 1/2 page.

Introduction to Christopher Banta’s article described below.

[Additional keywords: twelve-tone equal temperament, scales, mathematics, psycho-acoustics, pitch, logarithms, logarithmic, equations]

“Scales and Their Mathematical Factors” by Christopher Banta. 1 & 1/2 pages. 5 tables.

Systematic explanation on how to use mathematical equations for determining frequencies for equal tempered scales, applied to twelve and non-twelve tone scales. [Additional keywords: twelve-tone equal temperament, scales, mathematics, psycho-acoustics, pitch, logarithms]

VOLUME 1 #6, APRIL 1986

“The Semi Civilized Tree: Designed and played by Nazim Ozel” by Bart Hopkin. 4 and 1/2 pages; 3 photos.

The Semi-Civilized Tree is a stringed instrument using the natural form of a tree branch. Its construction, playing techniques with a performance review and its future possibilities are described. It uses over four hundred strings. Harp, cello, violin, guitar, mandolin, and banjo strings work best. Ozel uses a Frap Flat Response Audio Pickup transducer (contact mike) to amplify it for performance. Guitar and harp tuning pegs are used, and several tuning arrangements coexist: some are deliberate, some random. Ozel is a Turkish-born musician and visual artist who studied the Ney flute with master musician, Aka Gunduz. [Additional keywords: driftwood, trees].

“Letters” 2 pages; 1 photo.

Tom Baker’s photo of an 8-string guitar. Bob Flower provides tuning and construction tips. [Additional keywords: tone holes]

“The Ceramic Whistles, Flutes, Ocarinas and Mirlitons of Susan Rawcliffe” by Bart Hopkin. 2 pages; 6 photos, 3 drawings.

A photo spread with brief text descriptions of the acoustic and harmonic characteristics of these hand-built clay instruments. Many are based on pre-Columbian, Olmec, and Mayan designs. Some have multiple chambers and exotic shapes. The timbre of her single, double, and triple cylindrical fipple flutes is manipulated by varying the bore shape. Background and contact information about the builder herself is also included. [Additional keywords: mouthpieces, fish skin, kazoos, tone holes]

“The Melophone, the Harmoniphone, and the Melo-Harmoniphone: Names for Invented Instruments” by Bart Hopkin. 1 page.

An essay on the aesthetics of naming unique musical instruments that takes into consideration how they are categorized and

recognized, as well as how the nature of language plays its role in recognition and aesthetic thought.

Books Reviews. 1 page.

Review of the *Sound/Art Exhibition* catalog, with an essay by Don Goddard. The exhibit was curated by William Hellerman and sponsored by the Sound Art Foundation in 1983; held at The Sculpture Center and BACA/DCC Gallery in New York. Many of the artist are mainly visual artists. Contributors include Vito Acconci, Connie Beckley, Bill & Mary Buchen, Nicolas Collins, Sari Dienes & Pauline Oliveros, Richard Dunlap, Terry Fox, William Hellerman, Jim Hobart, Richard Lerman, Les Levine, Joe Lewis, Tom Marioni, Jim Pomeroy, Alan Scarritt, Carolee Schneemann, Bonnie Sherck, Keith Sonnier, Norman Tuck, Hannah Wilke, and Yom Gagatzi.

Kitchen Bands. 1/2 page.

A brief observation about the number of bands that play old-time popular music with household utensils. Among the questions are whether this is an isolated happening or a uniquely American tradition. The article cites four bands; primarily made up of seniors and all having a good time: The Maple Manor Cuties; The Jolly Dozen Band; Shearer’s Kitchen Band; The Women’s Club of Hawthorne. [Additional keywords: folk music, nursing homes, percussion, kazoos, washboards]

The Galpin Society. 1/2 page.

Named after pioneer organologist and researcher Canon Francis W. Galpin, this British scholarly organization is devoted to the cultural and historical study of primarily European musical instruments. Founded in England, it has a longer history than its American counterpart, the American Musical Instrument Society, and many prominent musicologists have served as its officers. Contact, journal, and membership information is supplied. [Additional keywords: periodicals, scholarship]

VOLUME 2, #1, JUNE 1986

Letters. 1 1/2 pages; 2 drawings.

Ivor Darreg and Tony Pizzo respond to the article in issue #6, Volume 1, on creating interesting names for new instruments. Ward Hartenstein provides two drawings of his own bamboo instruments: the Tonquiro and the Devil Stick. [Additional keywords: Theremin, Megalyra, kazoo, Kosmolyra, Spoils of War, Harry Partch, Susan Rawcliffe, scrapers, strikers, shakers]

“Stephen Smith’s Conduit Marimbas and Glass Marimbas” by Bart Hopkin. 6 pages; 2 photos, 7 drawings and diagrams. The design and construction of these microtonal instruments was inspired by Bill Colvig, Lou Harrison, Harry Partch, and Erv Wilson. Resonators of the glass marimba were made from plastic

ABS pipe. The Conduit Marimba uses EMT, or electrical metal tubing, for sounding bars. The detailed explanation and illustrations show how to find nodes and how the sounding bars are mounted and suspended over tuned cylindrical resonator tubes, among other tuning and construction techniques. H.R.

Bosanquet, the 19th-century designer who devised a keyboard for 53 tones per octave, provided a logical layout for the pitches. A sidebar briefly explains Smith's interest in alternatives to twelve-tone equal temperament and his 31-tone equal temperament system. Smith also builds instruments on commission. [Additional keywords: diatonic scales, Tubalongs, tubulons, intonational systems, xylophones, esoteric tunings, just intonations]

"Teaching with Homemade Instruments: The Work of Robin Goodfellow" by Bart Hopkin. 3 1/2 pages; 6 drawings. This Oakland-based artist conducts classes for children and adults. Students are taken through many and varied music-making activities. She also works several genres of arts and crafts, and incorporates this into her music teachings. She has made a set of six illustrated books, each devoted to one category of instruments: drums, idiophones, strings, reeds, horns, and flutes. Each book is subtitled "Recognition, Construction, and Performance," contains a description of its instrument type and its principles, plus several instruments that children can make and play, using readily available materials, and a complement of pieces and games. Some of the simple instruments her students make and play are soda straw oboes and clarinets. Companion books are in preparation, and they can be ordered directly from Goodfellow. Contact information is provided. [Additional keywords: pedagogy, Mandala Fluteworks, schools, workshops]

"A Bibliography for Available-Material Instrument Making: With an Emphasis on Children's books and Teaching Materials" by Tony Pizzo. 2 pages. A bibliographic overview of resources relating to homemade instruments for young students. [Additional keywords: pedagogy, schools, workshops]

VOLUME 2, #2, AUGUST 1986

"Daniel Schmidt's American Gamelan Instruments" by Bart Hopkin. 6 1/2 pages; 5 photos, 6 drawings. Schmidt builds instruments rooted in but independent of the traditional Indonesian types. [Additional keywords: sounding bars, metallophones]

Letters. 2 pages.

William Holden, Bill Minor, Tom Baker, and Ivor Darreg offer their knowledge and thoughts on what scope EMI should have; a question raised in an editorial from an earlier issue.

"The Megalyra Family of Instruments" by Bart Hopkin. 1 page; 1 photo. An introduction to Ivor Darreg's article on the design and construction of his Megalyra family of string instruments. Two char-

acteristics are noteworthy: they possess multiple tuning systems, and the visual guides in the form of fret-lines which make for ease of playing in any number intonational systems; both just and equal. [Additional keywords: slide guitars, steel guitars]

"Megalyra, Drone, and Newel Post" by Ivor Darreg. 4 pages. 1 photos, 1 drawing.

Darreg presents vital design and construction information for making this group of stringed instruments; to explore the advantages of flexible pitch offered by the Hawaiian or Steel Guitar. The instruments are like giant four-sided guitar necks. Each side has a different tuning system combining equal or just intonation. The author traces the process of experimentation with materials: wood, strings, and piano wires. General rules of thumb regarding tuning, tension, and string length are given. The instruments use magnetic pickups for amplification. On each side, a visual pattern of fret-lines serves as a guide for the player. Figures are given for wire sizes and corresponding pitches, and for tuning pin sizes. [Additional keywords: bridges, microtonality, fretting, harmonics, sitar]

The American Gamelan Institute. 1 page.

The American Gamelan Institute was originally based in Oakland, California [relocated to Hanover, New Hampshire after publication of this article], serves an international network for people interested in gamelan music in Indonesia and abroad. The article gives general background and information on the organization's journal, *Balungan*. It includes articles on scores, schools, building techniques, tuning systems, concerts, and interviews. [Additional keywords: Java, Bali, Sunda, Indonesia, gongs]

"Six Un-Invented instruments" by Tim Olsen. 2 pages; 6 drawings.

The author describes six fanciful instruments. Though whimsical they are not entirely impractical. The Sticcolo is a tiny transverse flute. The Selpreg or Selective Preference Guitar adapts a sansa made of saw blades to its body, and offers an alternative to sympathetic strings. The Great Pedal Clapichord and the String Carillon are extrapolations of a clavichord action. The name of the Teepeeegurdie refers to the shape of this motorized hurdy-gurdy possessing 50 or more long-strings. The Stompano can be visualized as an inside-out zither. [Additional keywords: hammers, soundbox]

"Instruments Without History: The Difficulty of Gaining Acceptance For Instruments Without Existing Repertoire, Established Technique or Trained Players" by Bart Hopkin. 2 pages.

An easy-to-read speculation, supported with some anecdotal evidence, on why some new instruments are more acceptable to musicians and the public than others. [Additional keywords: techniques, traditions, patents.]

VOLUME 2, #3, OCTOBER 1986

"The Waterphone" by Bart Hopkin. 4 pages. 1 drawing; 1 photo. The Waterphone was invented and patented by Richard Waters. This article's narrative describes how he applied his abilities as a sculptor to an idea inspired by the kalimba (also known as a sanza or mbira) and the Tibetan water drum. A family of instruments developed around this simple construction of bronze rods welded to steel bowls, with an upright metal tube in its center. While this article gives a detailed description of the instrument's tuning and acoustic behavior, it is noted that Waters has gone to great lengths to prevent imitators from copying his ideas and methods. This instrument has been used widely in recordings, performances, and in movie and TV sound scores, and is sold commercially. Each instrument is individually tuned, but not to a standard chromatic or diatonic scale. Water movement inside it alters the resonating frequency of the body, resulting in its peculiar pitch bending and timbral shifts. Contact information is also provided. [Additional keywords: metallophones, whale songs, sound effects.]

Letters. 1 page.

In reference to the EMI recordings, Ross Mohn comments on the difference between imagining a sound described verbally, versus hearing it.

"Gourd Instruments Made and Played by Minnie Black" by Bart Hopkin. 3 pages; 8 photos.

Nearing age 90, this Kentucky folk artist has made many harps, mandolins, guitars, lutes, drums, and hybrid instruments from dried gourds. This natural material has been used in many cultures since ancient time and grows in an immense variety of sizes and shapes. Photos and captions illustrate their construction and decoration, along with a picture of her group, the Gourd Band, in performance. [Additional keywords: The American Gourd Society]

"Principles of Mallet Design: Approaches to Mallet Making for Various Types of Percussion Instruments" by Rick Sanford. 3 pages; 4 photos; 2 drawings.

This article details homebuildable mallet designs for maximizing tone production instead of producing odd effects. It provides basic theory and practices and explains their purposes, as well as tools and sources, and mallet care. [Additional keywords: sticks, drums]

"The Mallet Kalimba" by Robert Rich. 1 1/2 pages. 2 diagrams. Conceived and built by Darell Devore; the version described here was built by the author. A perfect beginner's project, it can be built with inexpensive materials (under \$10 at 1986 prices): aluminum or steel rod; wooden dowel rod; particle board or press-board; styrofoam ice chest; adhesive foam rubber strips; 1" wood screws. The making of ping pong ball mallets is described, along with its bright sound; sounding similar to an African mbira and Balinese metallophone or gamelan instrument. [Additional keywords: resonators]

Books: *Prior's Reference Handbook of Music Math*, by Glen A.

Prior. 3/4 pages.

Review of a book on scale theory and related topics published in 1985 by Moustache Blue. Main topics in this concise, no-nonsense book: logarithms; nomenclature; derivation of the Pythagorean comma; beats per second; finding the guide tone; string lengths and stopping points; difference tones and summation tones; keyboard layout and interval names for 31-tone tuning; Greek modes.

VOLUME 2 #4, DECEMBER 1986

"Polychord 1 and Microtonal Steel Guitar Fretboards" by Sieman Terpstra. 3 pages; 2 photos.

The author describes his system of fretboard markings for instruments inspired by Ivor Darreg's Megalyra family. Based on the lap-steel guitar, Terpstra plays his instruments with a sliding metal bar rather than pressing against frets. Sieman's fingerboard overlays serve as guides to placement of the bar as well as conceptual organizers of harmonic relationships, which can be perceived either musically or mathematically. He details how color sequences are related to tuning of the pitches and chords, measurements for string lengths; and various Hindu, Chinese, and Greek scales. [Additional keywords: just intonation, equal temperament]

"The Glass Harmonica" by Vera Meyer. 4 pages; 3 photos, 1 drawing.

Opens with a brief history of the 18th-century instrument redesigned by Benjamin Franklin, now being built by Gerhard Finkenbeiner. Healing powers were attributed to its haunting and ethereal sound. Its past and current construction and mechanics are detailed. It is a friction idiophone: many sizes of cup-shaped quartz glasses spin on a motorized treadle, sounded by rubbing the rims with fingers. Meyer also performs on the instrument and is a member of the organization Glass Music International. Available recordings are also listed. [Additional keywords: glass blowing, armonicass, musical glasses, carillons]

"New Sounds From Old Sources: Musical Signal Processing with Microcomputers" by David Courtney. 6 pages; 5 diagrams. Introduced by Bart Hopkin, Courtney gives an overview of analog and digital audio fundamentals, a history of electronic sound modification, a simple hardware setup, some of the most musically useful DSP effects, synthesis and digital sampling. [Additional keywords: microprocessors, software, programs, samples, synthesizers]

The Just Intonation Network. 1 1/4 pages.

Formed by a network of Bay Area composers in 1984, this organization based in San Francisco, California is devoted to the spread and development of music based in just intonation. They publish a journal and hold lectures and discussions. Membership and contact information provided. [Additional keywords: associations, intervals, microtonality, musical scales and scale theory]

“Some Introductory Words on Just Intonation” by Bart Hopkin. 1 1/4 pages.

This article explains some of the audible and practical differences between music made with intonational systems other than twelve-tone equal temperament. While there is continuum of pitch between any two notes an octave apart, just intervals or pitch relationships use selected frequency ratios. After Harry Partch, a considerable increase in the number of people who explore tonal possibilities outside of 12-equal occurred, represented in a number of organizations that are listed in this text. [Additional keywords: associations, Ivor Darreg, microtonal, non-western tuning systems, societies, society]

Recordings: *Parallel Galaxy* by Emmet Chapman. 1 page.

This review of a record featuring Chapman on the Stick, also describes the fretted string instrument's design and construction. It has no body because of electronic amplification. It is not plucked or bowed, but rather sounded by a playing technique guitarists call hammering-on, with eight fingers available for tapping as in a keyboard-like fingering. Well known musicians have brought the stick to recognition: Tony Levin; Peter Gabriel; Alphonso Johnson. [Additional keywords: guitars, jazz, Stanley Jordan, commercial enterprise, patents]

“Lark In The Morning Search and Sell Services.” 1/4 page.

Side bar announcing a way for builders of unusual instruments to sell through a retail outlet. Their services are described and contact information provided. [Additional keywords: commercial, consignment, enterprise, marketing, patents]

VOLUME 2 #5, FEBRUARY 1987

Letters. 1 page.

Anita T. Sullivan announces her book, *The Seventh Dragon: The Riddle Of Equal Temperament*, which was winner of the Western States Book Award. In reference to an article on destructive communication in Volume 1 #4, Michael Meadows comments on nail-violins. In reference to the Sticcolo described in the “Un-Invented Instruments” article in Volume 2, #2, Susan Rawcliffe notes that pre-Columbian Americans invented one 1,000 years ago

“Keyboard Alternatives: Some Opening Thoughts and Background” by Bart Hopkin. 4 pages; 1 diagram.

Discusses ergonomically designed layouts for the pitches of diatonic and chromatic keys and levers of the standard European keyboards, which evolved from organs, pianos, harpsichords. Graphics show several new spatial arrangements or patterns for pitch relationships as reflected in keyboard design: Limbaclav by Bob Phillips, modeled after the African kalimba (mbira) emphasizes interchangeable or modular designs. The 6-6 keyboard reduces the tonal bias to C major. Harry Partch's Chromelodeans were harmoniums, as well as the Diamond Marimba and Quadrangulis Reversum; rebuilt to his preferred scales. Articles that address this topic in EMI and other publications are listed.

[Additional keywords: clavinet, claviers, ebony, intervals, ivory, mechanisms, Ivor Darreg, Erv Wilson]

“The Sohler Keyboard System” by Mel Sohler. 1 1/2 pages. 1 photo; 1 diagram.

A logical and practical arrangement of keys with fewer fingering patterns to be learned for playing in different keys. Coupled with his notation system, Sohler's keyboard design accelerates learning and eliminates confusion in sight reading. It incorporates symmetrical arrangements of key groups. It is an ideal alternative controller for electronic instruments. [Additional keywords: clavinet, claviers, ebony, ergonomics, intervals, ivory, organs, pianos, harpsichords, patterns]

“Piano On the Half Shell: Comments by Ivor Darreg” by Ivor Darreg. 1/2 page.

With a reprint of a 1965 Time Magazine article about a curved piano keyboard design proposed by Monique de la Bruchollerie, the author observes that musical developments make traditional pitch arrangements obsolete, yet practical innovations remain suppressed. [Additional keywords: clavinet, clavichords, ebony, ergonomics, intervals, ivory, organs, pianoforte, harpsichords, patterns]

Book review: *Percussion Notes Research Edition, Vol. 24 #3/6: Deagan Catalogs*. 1 1/2 pages. 2 drawings.

Percussive Arts Society occasionally publishes special issues of its journal *Percussion Notes* devoted to topics of scholarly and historical interest. This issue reprints five early catalogues from the 1920s by the J.C. Deagan Company, manufacturer of percussion instruments. Their finely detailed illustrations present thoughts on possible sound sources; reminders of a time when people spent less time with passive entertainment. Unusual and innovative items appearing in the catalogs include bells with resonators; marimbaphones with bars played with mallets, rosined gloves or bows; organ chimes made in metal but otherwise identical to traditional bamboo anklungs, a friction-rod instrument called aluminum harp, and tuned sets musical coins and rattles. [Additional keywords: marimbas, glockenspiels, metallophones, tubes, xylophones]

“A Set of Aluminum Just-Intonation Tuning Forks” by Warren Burt. 2 pages; 1 drawing.

Begins with the author's background experiences leading to the making of a set of tuning forks tuned to a 19-tone per octave scale. He notes published sources for his research into ancient Greek modes, including theories of Ptolemy and Harry Partch. Construction details and playing techniques are provided. The appeal of community music-making is discussed, and how the ease of learning to play the tuning forks facilitates this. Their sound properties are described: clear timbres; sine waves with long decay time; Doppler and phase shift effects, deep bass tones. [Additional keywords: mallets, percussion, resonators]

“The Fipple Pipe” by Denny Genovese. 2 notation examples.

Begins with the author's background experiences leading to the making of aluminum flutes that would play the scale of the harmonic series without finger holes. The absence of tone holes makes for distortion-free notes. A family of instruments evolved using mouthpieces of the standard recorder style, which function differently from recorders in length and diameter. The playing techniques, maintenance, musical notation, and ensemble methods are briefly described. Ordering information for his book and tape provided. [Additional keywords: just intonation]

Periodicals: *Vierundzwanzigstelschrift Der Internationalen Maultrommelvirtuosengenossenschaft*, and *Sawing News of the World*. 1 1/2 pages.

VIM and SNW are organizations and periodicals devoted to the Jew's Harp and the musical saw. Their content and activities are described. SNW is a publication of the manufacturer, Mussehl and Westphal in Wisconsin. VIM from Iowa City is a scholarly journal with a humorous character. Information on festivals for saw enthusiasts are also listed. [Additional keywords: Kazoophony]

"Notes Gleaned From Recent Writings by Pierre Jean Croset" by Bart Hopkin. 1 1/2 pages.

Croset is a French designer and builder of new musical instruments who wrote an article about his travel in the U.S. to study activities of his American counterparts. Cultural differences were examined. The broad categories of activity were sound sculpture, sound architecture, new instruments for conventional music, and instruments for new and avant garde forms. The article lists some of the new instrument designers in France. Croset's remarks on the past, present, and future of musical exploration are also reprinted. Historical and practical concerns impacting communication, research, learning and innovation are discussed.

"Great Instruments #9: The Medica Musica" by Enoch Helm, aka Michael Gowan. 1 page; 2 drawings.

(Humor) Reprint of an article on little-known instruments from *The Swallowtail Jig*, a newsletter of the Columbine Hammer Dulcimer Society. The brief stories tell of stone bells played by Egyptian pharaohs and pipes with healing powers.

VOLUME 2 #6, APRIL 1987

Letters. 2 pages.

Further comments by Ivor Darreg describing his experiences and writings on developing curved keyboard layouts for piano and stringed instruments. He also discusses the constraints of established practices, with reference to the Clutsum Keyboard discussed in his earlier short article (EMI Volume 2 #5) "Piano On the Half Shell". [Additional keywords: ergonomics, intervals, Megalyra, patents]

"The Musical-Acoustical Development of the Violin Octet" by Carleen M. Hutchins. 4 pages; 1 photo; 1 graph.

The author describes the impetus, research, design, and construction of a set of violin-type instruments capable of carrying the timbre and tone of the violin family into seven other pitch ranges — one at approximately each half octave from the double bass to an octave above the violin. Hutchins is a central figure in the Catgut Acoustical Society and began this project in 1956. Among many people who helped are composer Henry Brant at Bennington College, and the violin maker Fred Dautrich. Issues of wood resonance and air resonance; f-holes; string and body length relative to fingering patterns are explained and also charted in the graph, along with descriptions of the instruments' sound properties. [Additional keywords: cellos, double bass, consort, fiddles, soundboards, violas]

"More Gourds" by Bart Hopkin. 7 pages. 11 photos; 5 drawings. Introduction to articles on gourd-resonated instruments written by Tony Pizzo, Matthew Finstrom, Lucinda Ellison, and Larry Sherman. This is a follow-up to the article on Minnie Black (Volume 2 #3). Contact information for each builder-writer is also provided. [Additional keywords: The American Gourd Society, resonators, natural materials]

"Mbiras" by Lucinda Ellison. 1 1/2 pages. 3 photos; 1 drawing. The author makes finely crafted and decorated kalimbas, shakers, drums, and bamboo flutes. Her main focus is the African thumb piano, also known as the kalimba or mbira. The gourd resonators have soundboards made of African woods: Mahogany, Padauk, or Ebony. A drawing diagrams the various and flexible tuning arrangements of the nickel plated keys, or tines. [Additional keywords: The American Gourd Society, resonators, natural materials]

"Four Gourd Resonated Instruments" by Tony Pizzo. 1 1/2 pages. 4 photos; 2 drawings.

The author specializes in the design of available-material world instruments. Design and construction of the Indian Tamboura, Double Strung Bow, Berimbau, and the Giant Bow inspired by Bill and Mary Buchen, is described. Drawings diagram the design of the tamboura bridge and the double string bow. The latter is traditionally mouth-resonated. [Additional keywords: The American Gourd Society, mouth bows, javari, resonators, natural materials]

"Balafon, Vina & Mvet" by Matthew Finstrom. 2 1/2 pages. 4 photos; 2 drawings.

The author is a performer and builder of traditional instruments inspired by Minnie Black's folk instruments. The Mvet is type of stick zither or harp found in Cameroon. Design and construction of the Harp Vina is similar to the sitar. It has tuning pegs for five double strings and the gourd resonators are part of the original design in this ancient Asian Indian instrument. [Additional keywords: The American Gourd Society, natural materials]

"The Oxford Gourd Ensemble: A Dispersed and Continuing Conceptual Piece with Occasional Site-Specific performances"

by Larry Sherman. 3 pages. 3 photos.

The author is a performer, educator, and builder interested in cognitive theory. The article describes the theoretical sources and conceptual basis for his performance group. The group rarely functions literally as a performance ensemble, but rather is a kind of social and conceptual extension of the ensemble concept. [Additional keywords: Minnie Black, The American Gourd Society, resonators, natural materials]

Book review: *Leonardo Da Vinci As a Musician*, by Emanuel Winternitz. 1 1/2 pages.

Review of the first scholarly book on the musical side of Da Vinci's work. It examines the times he lived in, accounts of his contemporaries, his personal notebooks, and sketches; some predate instruments and methods that were realized centuries later. These are full of ideas, theories on acoustics, performance, and instrument designs. Much of his attention was devoted to designing the mechanics of the Viola Organista, a bowed string keyboard instrument, apparently never realized. [Additional keywords: drawings, mechanisms, organology]

Recording review: *The Way I See It and You've Got the Option* by Ernie Althoff & Rainer Linz. 1/2 page.

Review of a cassette recording by Australian artists Ernie Althoff and Rainer Linz. The recording combines spoken text with a random music machine, an automatic, motorized percussion device that sounds kitchen utensils, and toy instruments, among other non-musical objects.

VOLUME 3, #1, JUNE 1987

"Letters" pages. 3 photos, 1 drawing.

Hal Rammel cites a source for musical saws. Ivor Darreg responds to questions about reed instruments, continuous controllers for electronic instruments, raised in the EMI's last editorial. Francois Baschet addresses destructive communication, standing waves, and progressive waves for tuning instruments. Tom Reed talks about his 6-6 keyboard layout. Michael Meadows on glass harmonicas and fipple pipes. Sieman Terpstra offers a solution for the problem of symmetry with the 6-6 layout. [Additional keywords: variable capacitors, Ondes Martenot, Trautonium, ribbon controllers, variable resistors]

"Hybrid Instruments Designed and Built by Ken Butler" by Bart Hopkin. 3 pages; 5 photos.

Butler builds fully playable electric guitars from found objects and commonly available materials. Their striking visual content is derived from the electric guitar as a potent cultural icon. However eccentric, their construction always emphasizes quality of musical and sculptural execution. A recent exhibition catalogue is available from the artist. [Additional keywords: Hybrid Visions, readymades, collage]

"The Evolving Natural History of the Wall Harp" by Sylvia and Robert Chapman. 1 page; 1 photo.

A short history and how-to about a one-string instrument made and played by sharecroppers in the Southern United States. [Additional keywords: folk instruments, blues, bottle neck slide, monochords]

"Slide Whistles" by Bart Hopkin 4 pages; 1 photo, 6 diagrams, 1 drawing.

Vigorous promotion of an underestimated variable pitch instrument with a husky or breathy tone, along with details of the many and various ways they can be made, tuned, and played. [Additional keywords: fipple instruments, air columns, calibrations, slides, childrens' instruments]

"Kayenian Musical Instruments" by H. Barnard 2 pages; 3 photos, 2 tables

A series of instruments using just-intonation described in the form of a story about an "ancient culture" in an imaginary country called the "Kayenian Imperium." Some of the instruments are stringed, such as the streemo, pluing, and abrool. Some electronic organ instruments are also described. The article opens with an explanation of how the keyboard layout facilitates its 19-tone just-tuning. [Additional keywords: frets, hybrid instruments]

"Wind Suck, A Sound Sculpture" by Yehuda Yannay and Stephen Pevnick. 1 and 1/4 pages; 1 photo, 2 diagrams.

Description of the design and construction of an interactive musical instrument displayed at the Milwaukee Art Museum in 1985. It uses flowing air resonance with electronic amplification, and electrical-mechanical wind propulsion systems (industrial vacuum cleaners). Diagrams detail the coupling of flexible plastic tubing to exhaust stacks and the blower. Microphones are also used in its construction and it lends itself to ensemble playing. [Additional keywords: drones, wind socks, sound installations]

"Organizations and Periodicals". 3/4 page.

The National Association of Professional Band Instrument Repair Technicians (NAPBIRT) based in Normal, Illinois has an annual convention and newsletter, Technicom. Membership, convention and contact information provided.

"Books & Recordings". 1 page.

Making Music: Contemporary Musical Instruments and Sound Crafted in California, review of the exhibit catalog and accompanying cassette. [Additional keywords: exhibitions, curating, galleries, installations]

VOLUME 3, #2, AUGUST 1987

"Letters" 1 page; 1 photo.

On the topic of continuous-strip pitch controllers, Phillips tells of a PAIA Electronic synthesizer kit with a built-in ribbon controller. Tony Pizzo announces two reference books, Susan Caust

Farell's Dictionary of Contemporary American Musical Instruments, and Paul Berliner's *Soul of Mbira*. Blake Mitchell argues for the efficacy of the 6-6 keyboard layout in terms of physical space that the keys occupy. [Additional keywords: marimbas, glissandi, Ondes Martenot, mallets]

"The Sound Garden Exhibit In Tokyo" by Leo Tadagawa. 3 pages; 9 photos.

Review of environmental sound sculptures and devices shown at the Striped Museum of Art in 1987 by fourteen artists. Their enjoyment harkens back to natural sounds of the Japanese Suikinkutsu (an unglazed pot buried in the ground into which water drips), or the traditional garden, or Huurin (a glass or iron bell). Some of the pieces take the form interactive sound installations, others straddle the differences of sculpture and musical instruments, some use electronics while others do not. A catalog is available. [Additional keywords: nature sounds, wind chimes, available materials, sound art, games]

"Modular instrument Systems" by Bob Phillips. 3 pages.

The composer, builder, and author puts forth the concept of modularity, a special approach to the physical placement of pitches on instruments. Modular design enables the layout of pitches to be flexible and facilitates playing techniques by making the selection and sequence of pitches easier. The article addresses practical issues of capability, accuracy, and cost. (With footnotes.) [Additional keywords: Harry Partch, ergonomics]

"The Trumpet Marine" by Michael Meadows 2 1/2 pages; 3 photos, 2 drawings.

Brief discussion of the history, playing techniques, and construction of this bowed monochord, also known as the tromba marina, trumscheit, and nun's fiddle. A Renaissance instrument that uses a peculiar buzzing bridge. Made for playing harmonics, gave it a distinct brassy, trumpet-like timbre. Strings inside the body enable sympathetic vibrations to effect the sound. [Additional keywords: early instruments, nodes, bridges, tuning pegs]

"Au Ni Mako" by Bart Hopkin. 1 1/2 pages; 1 drawing.

One of the simplest traditional instruments, the "stamping tube" is a hollow tube that produces sound when struck against a surface. Usually made of bamboo or wood, these idiophones are found in Asia, the Pacific region, South America and the Caribbean, and Africa. The article describes construction, playing techniques, and history in the various regions and cultures that it used. [Additional keywords: ethnomusicology, world music, air columns, Trinidad, Solomon Islands, percussion, Carnival Music, drums]

"Organizations and Periodicals". 1/1/2 pages; 1 drawing.

The Society for Ethnomusicology, based in Ann Arbor, Michigan, is one of the most prominent societies in this field of scholarship. The author describes its history and problematics of the science. The SEM Newsletter is critiqued, with membership, convention and contact information provided. [Additional keywords: anthro-

pology, archaeology, associations, musicology, research, scholarly journals, world music]

VOLUME 3, #3, OCTOBER 1987

"Letters" 1 1/2 pages; 2 photos.

Richard Waters offers two "Gravity adjusters" albums. A picture of Bob Phillips' Twomey, a 70cc syringe that makes a fine slide whistle.

"Editorial" by Bart Hopkin. 1/2 page; 1 drawing.

This request to the readership for help on topics regarding strange and rare instruments and interesting sounds is useful as jog the imagination. List of scintillating effects and topics: phase shifting, pitch wavering, volume swells from swung trumpets and spinning bells; The Pyrophone first invented by Georges Frederic Eugene Kastner in 1873, using flames to activate an air column; the Tang Koa bamboo chime operated by waterpower; leaf and grass oboes; Banda Mocha ensemble from Equador; underwater instruments.

"Structures Sonores: Instruments of Bernard and Francois Baschet" by Bart Hopkin. 6 1/2 pages; 1 photo, 11 drawings and diagrams.

An informative and extended look at the fertile explorations, and particular acoustic design innovations, of the Baschet brothers. They have been designing and building concert instruments, sound sculpture, children's instruments, sound environments, and large-scale public works since the 1950s, receiving much recognition and many commissions in France. Their system of four construction elements applies to all instrument materials: vibrating elements; energizing elements; modulating devices; amplifying devices. Transmission and isolation of vibrations, sound radiators, and reverberant devices are discussed. Numerous diagrams and illustrations of the creative, imaginative, visually striking, and often humorous instruments make this article an excellent teaching tool. [Additional keywords: balloons, bridges, classroom, construction methods, conduction, dancers, glass rods, guitars, high impedance, low impedance, resonators, metal rods, percussion, steel bars, threaded rods, tuning weights]

"The Slide French Horn: 'Funnybone'" by Ray L. Kraemer 2 pages; 3 photos.

Design, construction, and playing techniques of the Funnybone, combining a French horn bell with a trombone slide. To allow the bell to clear the slide an upward slant and bracing were necessary, which resulted in better projection than a conventional trombone. It has a sound that can be compared to a trumpet and flugelhorn. It fits well in modern jazz structures and is easy to play for a trombonist or lower brass player. [Additional keywords: blowing resistance, horns, tuning devices, slide positions, trumpets]

"Pedagogy, Santa Fe Research: Some of Their Work" by Marcia

Mikulak 5 1/2 pages; 9 photos.

The author describes the experiences and discoveries that led to The Santa Fe Research center, where children and adults pursue their interests through an exploratory approach. Her studies at The Center for Contemporary Music at Mills College led to an interest in alternative and interactive learning models. In the second half of the article she describes her teaching experience with children and the instruments, with photos, they made from available materials: violins, harps, guitar-like instruments, marimbas, and a steel drum. A sidebar reports on the surprising test results of Mikulak's work with learning disabled children. [Additional keywords: education, learning disabilities, resonators, strings, Robert Ashley, Gardner Jencks, Pauline Oliveros]

"Books and Recordings: Long String Installations". 1 1/2 pages. 1 drawings.

Review of a combination 3 LP set and full-sized book from Het Apollohuis, the now defunct center operated by Dutch sound artist Paul Panhuysen. The over-sized book documents the architectural aspects of the installations by Panhuysen and Johan Goehart with many large, clear, explicit, and attractive black and white photographs. Accompanying texts and diagrams describe just under forty installations. The introduction was written by Arnold Dreyblatt. A longer text by Panhuysen details the ideas and processes behind the work. This review details some aspects of the construction and performances. [Additional keywords: acoustics, Ellen Fullman, Eindhoven, Holland, Netherlands, nylon monofilament, environmental sound, space, public works]

VOL. 3, #4 DECEMBER 1987

"Letters" 2 pages; 3 photos, 3 diagrams.

Tom Nunn in response Bob Phillips' article on modular instrument design provides diagrams for his own electroacoustic Bug, which lends itself to various layouts due to its geometric shape. Ivor Darreg critiques the Kurzweil design philosophy and demo tape of sampled grand piano sounds. Illustrations of a slide whistle made out of a bicycle pump by Jacques Dudon and extended harmonic series Fipple Pipes by Denny Genovese.

"The Pyrophone Explained" by Michael Meadows. 1/2 page.

A description of the physics behind its sound, also described in William Bragg's book "World of Sound." The Pyrophone, first invented by Georges Frederic Eugene Kastner in 1873, activates an air column with a gas flame. This article, with additional materials, is among the articles posted in the Experimental Musical Instruments website at <http://www.windworld.com/emi>.

"Tata and His Veena" by David Courtney. 4 pages; 3 photos, 3 drawings.

An article about the author's discovery of an elderly East Indian musician, Tata, who plays a Kamakshi Veena, a self-designed and -built violin made of bamboo, a bowl resonator with animal

skin membrane, horse hair, sticks, resin, colored paper, cardboard, and string. The article pays much attention to the diverse economic and cultural realities of India, and this specific region, as it does the builder's highly inventive construction techniques. [Additional keywords: Asian, ethnomusicology, folk music, indigenous music, lutes, lyres, Hyderabad, bowed instruments]

"Bamboo" by Bart Hopkin 3 pages

An introductory to Darrell DeVore's following article on how this natural material lends itself so easily to the making of a great variety of instruments: flutes, necks for string instruments, lamella for mouth harps, drums, trumpets, single and double woodwind reeds, panpipes, bows, marimbas, rattles, wind and water chimes, aeolian pipes, guiros and scrapers, stamping tubes, and many others. Various species, the growth and cultivation, and physical properties of bamboo are described. [Additional keywords: Boo, Calungs, climate, Sansas, xylophones, thumb pianos, Chinese instruments, Japanese instruments, Asian instruments, Phyllostachys, Javanese instruments, didgeridoos, didjeridus, clarinets, oboes, violins, fiddles, Harry Partch, reed cane, zithers]

"Bamboo Is Sound Magic" by Darrell DeVore. 3 pages; 4 photos, 4 drawings.

The author describes his first-hand experience, the ancient universality of this material, and his own constructions. Among these are the bootoo, a stamped idiophone. Bootoo flutes, bootoo percussion, listening-tubes, singing-tubes, membranoflutes, and the Bamow spirit catcher are described with accompanying photos and drawings. [Additional keywords: aerophones, bird songs, Chinese instruments, earphones, Japanese instruments, Asian instruments, tone holes, reed cane]

"The Triolin" by Hal Rammel. 1/2 page; 2 drawings.

Brief description of the author's instrument, a hybrid of the nail violin and the waterphone. A three-sided wooden resonator attached to a chair leg, with a circular arrangement of perpendicular rods, so that the pitches can be spun around as it is bowed, for unpredictable phrases and harmonies — automatic musicking. [Additional keywords: random tunings]

"Organizations and Periodicals". 1/2 page.

Glass Music International, an organization based in Loveland, Colorado promoting all forms of glass music. They publish a newsletter titled Glass Music World, and are planning a conference and festival. (Since this article was written, they have had success with several such festivals.) The newsletter covers technical topics, scores, membership profiles, and scholarly research. Contact information is provided. [Additional keywords: musicology, publications, research, scholarly journals]

"Books: The EFNIR Catalog". 2 pages.

Review of the catalog to the *Exhibition/Festival for New Instrumental Resources I & II*. It took place in May of 1979 and 1980 and was co-sponsored by the University of California at

San Diego's Center for Music Experiment, and Interval Foundation. A diverse group of 25 contributors are presented in its 40 pages. Among them Paul Drescher, David Dunn, Jonathon Glasier, Pauline Oliveros, and Arthur Frick. [Additional keywords: associations, professional, publications, research, scholarly journals, sound art exhibitions]

"Tinkololin On the Head" by Bart Hopkin. 1 page; 3 photos. A pictorial of sound helmets and headbands created by Leo Tadagawa. Sound is communicated when the wearer walks. Aluminum tubes, beads, and a propeller device are attached to the headgear. These instruments appeared in the "Sound Garden Exhibit in Tokyo," reviewed by Tadagawa in EMI Vol. III, #2. [Additional keywords: sound art exhibitions, clothing, wearable instruments]

VOLUME 3 #5, FEBRUARY 1988

"Letters" 2 pages; 3 photos. Jonathon L. Haas proposes the world's largest timpani made of bowls. Three photos of Pierre Jean Croset's new instruments made of plexi-glass: a water drum, an electroacoustic kalimba, and a carbon-fiber neck altuglas guitar.

"Jacque Dudon's Music of Water and Light" by Tom Nunn. 6 photos; 3 drawings. This French inventor has made instruments that use five principles of water: percussion, friction, modulation of resonant objects, water-forced air pressure, and modulation of resonant air volumes. Some of the instruments are named the Sprigoviel, Aquacelesta, Aquavina, Orque de Bac a Fluers, Tambour-Oiseau-Harmonique, the Aquatic Synthesizer, and the Arc a eau. Some instruments combine two or principles like the Flute a Mouettes, or "Seagull Flute." Nunn briefly describes each with accompanying photos. The builder's Photosonic Synthesizer, a light siren, is given two pages of description with pictures of the rotating disks whose computer-generated patterns determine pitch and timbre. Dudon is also president of an organization called l'Atelier d'Exploration Harmonique that researches experimental musical instruments near Marseilles. [Additional keywords: bamboo flutes, bellows, drawings, drips, environmental instruments, electroacoustic, hurdy-gurdy, electro-mechanics, hydraulics, graphics, optics, rain organs, solar cells, photoelectric cells, vessels, waterfalls, waterphone, waveforms]

"The Custom Made Chromatic Flute" by Jim Schmidt. 3 pages; 1 photo, 1 diagram. The author describes how he conceived, acquired materials for, and constructed an orchestral flute for improved playability and tone. Some modifications involved the lip plate and resulting embouchure; others relate to the number and joint of the tube assembly. Improvements for fingering, as well as simplification and lightening of the mechanics are described. A diagram demonstrates the fingering system. [Additional keywords: wood-

winds, saxophones, keywork, silver tubing, tone holes]

"Travel Instruments: The Grand Piano In a Marching Band" by Bart Hopkin. 3 pages. Part one of a three-part article looking attempts to render standard instruments more transportable. This article is a broad historical overview; parts two and three each focus current designers.

"Traveling With the Traviello" by Ernest Nussbaum. 2 pages; 2 photos. One of two instrument designers who have developed a portable "travel cello." Issues concerning acoustical properties and functional design are described through several prototypes. Use of transducers, string length, various types of wood for the body, neck, and fingerboards are among the many problems that are solved. [Additional keywords: string tension, packing, shipping]

"The Birth of the Packaxe" by Francis Kosheleff. 3 pages, 3 photos, several diagrams. The third of a three-part article on designing transportable instruments. The solution for more portable guitars and other string instruments is the design of a folding neck, hinged at the body with an invisible locking mechanism. Issues and solutions concerning mounting and fingerboard action are addressed and illustrated. [Additional keywords: balalaika, tuning machines, packing, pegs, shipping, string tension]

VOLUME 3 #6, APRIL 1988

"Letters" Dennis James, Francois Baschet, and Leo Tadagawa provide quotes and notes about the Pyrophone. Bob Phillips answers Liz Was' question about her sighting of a percussion aerophone, a Tablita with design and playing details. Minnie Black, gourd instrument inventor and performer, and founder of the Gourd Band is making several radio and television appearances. [Additional keywords: Burning Harmonica, clay drums, Chemical Harmonica, gas organ, American Gourd Society, Palm Pipes, Waterdrums]

"Alternative tunings on Fretted Instruments—Refretting and Other Approaches" by Bart Hopkin with Mark Rankin 3 pages; 2 photos, 1 drawing. An overview on the design issues and techniques for removing old frets, how to substitute new ones in accordance with various alternative tuning systems. References and sources for fretting tables are provided. Movable frets are described, and interchangeable fretboards are among many other design possibilities offered in this article. [Additional keywords: equal temperaments, just intonation, fingering, fingerboards, fretting patterns, fretless guitars, sliding steel, string instruments, Enharmonic Guitar, microtonal scales, modifications, bridges, necks, experimental scales]

"Refretting: Comments from Ivor Darreg" 1 page; 1 photo. Ivor Darreg (now deceased) was first among contemporary builders to begin refretting for microtonal scales. He comments on the practical fingering and tuning problems of just intonation guitars due to fret placement and spacing, notably with 22-tone and 34-tone equal temperaments. [Additional keywords: fingering, fingerboards, fretting patterns, fretless guitars, string instruments, Enharmonic Guitar, microtonal scales, bridges, necks, experimental scales]

"Retrofitting for Non-Twelve Scales" by Buzz Kimball. 1 photo; 4 drawings, 1 table.

Tools and materials, alternative equal temperaments, choosing an instrument for refretting, removing old frets and preparing for new ones, installation, leveling and adjusting, replacing and inlaying a fingerboard are the topics covered in this practical article. A fretting chart and an algorithm for calculating fret tables not given in the article are provided. [Additional keywords: equal temperaments, fingering, fingerboards, fretting patterns, fretless guitars, string instruments, microtonal scales, just intonation, bridges, necks, experimental scales]

"The Overtone Series? The Harmonic Series as a Special Case, and Some Thoughts About Instruments with Inharmonic Overtone Spectra" by Bart Hopkin. 3 1/2 pages.

Based on the observation that many musical instruments do not naturally or automatically produce harmonic overtones, the article begins a general overview of overtone patterns and a discussion the nonharmonic patterns that exist in many instruments. The second part is reconsideration of how the ear responds to an irregular overtone series, and how these idiosyncratic relationships can function musically. A sidebar details the overtone series and its appearance in musical instruments. [Additional keywords: equal temperaments, fundamentals, harmony, idiophones, just intonation, tunings, tones, timbral, timbres, vibrations, frequency, frequencies, pitch, phasing, cancellation, partials, psychoacoustics, mathematics, theory]

"The Gravichord" by Bob Grawi. 4 pages; 5 photos, 2 drawings. In discussing the author's instrument based on the western African kora, the article describes the author's music and the circumstances that led to the instrument's creation. Intermediary versions of the instrument were made of fiberglass and wood, and included metal kalimba keys on its bridge. Later it came to have 24 strings spanning a 3 1/2 octave range on a light, welded steel frame, amplified with a piezoelectric pickup. Many other features of its tuning and construction are detailed. Sounding like an electric harp; its kora-like divided string layout allows both hands to play its diatonic scales. Playing technique allows for conscious control of seemingly random clusters of notes; melodic and rhythmic results that are complex, intricate, and unexpected. The instrument was patented and is marketed by his company, White Bear Enterprises. [Additional keywords: lutes, West Africa, Gambia, Senegal, Guinea Bissau, bridge designs]

"Books and Recordings". 1 page; 2 drawings.

A review of *Percussion, String and Wind Instruments* by Christopher Swartz published by Perimeter Records. The home-built orchestra features 30 instruments that were built by the author using available, commonplace materials, and are described with accompanying diagrams and photos useful for anyone interested in building their own versions of these percussion and guitar instruments. [Additional keywords: scrap metal, gongs, how-to, reference books]

VOLUME 4 #1, JUNE 1988

"Fourth Anniversary Editorial" by Bart Hopkin. 1 3/4 pages; no photos.

A summary of past achievements, editorial perspective, and future prospects for EMI.

"Letters". 2 pages; no photos.

Daniel Levitan, Michael Meadows, and Ivor Darreg offer additional notes on contemporary practice on marimba and vibraphone tuning, the overtone series and the validity of inharmonic instruments. Rick Sanford responds to Jonathan Hass' request for information on experimental timpani. [Additional keywords: harmonics, xylophones, free bars, mallets, partials, chords, membranophones]

"A Harmonic ensemble" by Michael Meadows. 2 1/2 pages; 1 photo, 1 diagram, 1 table.

Meadows wrote about his trumpet marine in EMI, Volume 3 #2, August, 1987, which is one of several instruments designed to articulate the pitches of the harmonic series. In the current article he describes the remainder of the instruments in the group: they consist of aerophones, Didjeridoos, notched flutes, fipple pipes, reed pipes, and stringed instruments. He also describes some principles of timbre and harmonics. [Additional keywords: partials, fundamentals, summation tones, difference tones, nodes, antinodes, edge-tones]

"Music For Homemade Instruments" by Skip La Plante. 6 pages; 2 photos, 3 drawings.

Music For Homemade Instruments is a composers' collective based in New York City that invents, builds, composes for and performs on instruments — mostly idiophones — which were made from the found objects and trash of the city. Most of them copy world instruments. Styrofoam boxes are used extensively as resonators. "Waterfall" was a large installation that used water falling on objects to create its sound, and was shown at P.S. 1 in New York (1977), and the Capital Children's Museum,

Washington D.C. (1983). [Additional keywords: Hemholtz resonator, metallophones, gongs, gamelan, pipes, PVC, musical saw, juice jars, cardboard tubes, cans, EMT, conduit, flutes, tubes]

“More Baschet Sounds: A Mostly Pictorial Presentation of Architectural works, Museum Installations and Educational Instruments Built by the Baschet Brothers” by Bart Hopkin and Francois Baschet. 4 pages; 6 photos.

This photo spread is a complement to the October 1987 EMI article [VOL. 3, #3] that focused on the mechanical principles and specific acoustic systems employed in the vast array of Bernard and Francois Baschet’s work. They have been designing and building concert instruments, sound sculpture, children’s instruments, sound environments, and large-scale public works since the 1950s. Their system applies four basic construction elements to all instrument materials: vibrating elements; energizing elements; modulating devices; amplifying devices. Their work addresses the design issues concerning the transmission and isolation of vibrations of steel and glass rods, sheet metal sound radiators and reverberant devices. Along with musical playgrounds, a musical water fountain and clock tower are pictured. [Additional keywords: balloons bridges classroom construction methods conduction creativity dancers efficiency, energy loss, France, functional, guitars, imagination, low impedance resonators, nodes, percussion instruments, bars, threaded, tuning weights, scales, surface area]

VOLUME 4 #2, AUGUST 1988

“Instruments of Shell, Tusk, Bone & Horn” by Bart Hopkin. 6 pages, 5 drawings, 8 photos.

An introductory overview of animal-derived materials in instrument making, both fresh and fossil. Information on sources and costs, cultural and historical background, physical and acoustic properties of these materials are covered. The types described include ivory tusks of elephant, mastodon, warthog, walrus, and hippopotamus. Whaletooth, narwhal tusks, conch shells, and turtle shells are also listed. The types of instruments these materials are used for include flutes, rattles, fiddles, marimbas, harps, lyres, resonators, soundboards, and trumpets.

“Letters”

Ivor Darreg gives several bits of general news and advice on tuning, frettings, unorthodox microtonal scales, with specifics on tuning steel conduit (or EMT) tubing marimbas. [Additional keywords: equal temperaments, octaves, metallophones]

“Bone Music by the Buchens & Bob Natalini” by Bart Hopkin 2 pages; 6 photos.

This photo spread shows Bob Natalini’s untitled cow jaw bone

object, which incorporates electronics. Four instruments made by Bill and Mary Buchen are shown. These were made from skulls, cowhorns, and antlers, and are named: Flying Beaver Rattles, Skullimba, Treble Elk Harp, and the Rosehorn Marimba. They performed with these in the Boneworks Ensemble from 1976 to 1981. [Additional keywords: kalimbas]

“A Cowhorn Fipple Flute” by John Jordan, 1 1/2 pages; 1 photo.

This article describes how the author solved the problem of making a reed instrument that sounds louder, and has a much wider pitch range than the average fipple flute. His version is 36 decibels louder than a soprano recorder. Playing technique, fingering, and construction are explained.

“Maurice Ravel and the Lutheal” by Hugh Davies. 3 pages; 1 diagram.

In the early half of the 20th century very few composers considered using new instruments in their compositions. Among the few who did was Maurice Ravel, who included the sarrusaphone, Ondes Martenot, and the lutheal. The lutheal is a modified piano developed around 1918 by Georges Cloeteus in Brussels or Paris. It uses jacks for different nodes on the strings, and has additional registrations, or stops, for its harpsichord, harp-lute, and cimbalon timbres. Since only one restored lutheal remains in existence, this very detailed article on its mechanical design also describes the detective work involved in tracing patents in order to learn about the inventor and his instrument. The author himself is one of the few British musicians who started to build new electroacoustic instruments in the late 1960s, and so the article opens with interesting general insights on the closer links between music and the visual arts, and the field instrument invention. Davies has published many pioneering studies on 20th century electronic instruments, and is a main contributor to the New Grove Dictionary of Musical Instruments. [Additional keywords: frames, dampers]

“Books & Recordings” by Bart Hopkin. 1/2 page.

The Vestal Press, a publishing house founded by Harvey Roehl, distributes unusual and hard-to-find materials on early Americana. Its catalog documents the era of late-19th century and early-20th mechanically reproduced music, namely player pianos, but also reed organs, calliopes, and hybrid instruments. They also print a newsletter, the Vestal House Organ, on in-house events and projects. Contact address supplied.

“Bentwood Chalumeau-A Glissando Clarinet” by Bart Hopkin. 3 pages; 2 photos, 2 diagrams.

The author describes the design and construction of a continuous-pitch, valve-less clarinet, named after its 18th century ancestor. In place of toneholes, a slit runs the length of a PVC tube. A bent tongue of springy hardwood is used to cover this open slit to varying degrees. Contact address supplied. [Additional keywords:

Leonardo Da Vinci, reeds, weather-stripping]

VOLUME 4 #3, OCTOBER 1988

"The Art of Noises by Luigi Russolo, Translation and Introduction by Barclay Brown" by Tony Pizzo. 6 pages; 1 photo, 1 drawing.

An extended book review of a new English translation of the writings by this early-20th-century Italian Futurist and instrument inventor. Pendragon Press has reprinted Russolo's first manifesto (written in 1913). Brown's introduction assembles a great deal of hard-to-find information, covering both its technical and historical aspects. Although his instruments were acoustic, Russolo's visionary ideas and instruments have been credited with being seminal in the development of electronic music. To realize his conception of a new music - timbres and rhythms that more closely resembled the actual sounds of nature, language, and modern life - Russolo invented, built and performed with a set of instruments he called intonarumori, or noise intoners. No published diagrams or plans of these instruments have survived, and very few recordings exist. Brown's research reveals that they used mechanical means to produce sound through cranks, levers, wires, and diaphragms enclosed in large boxes. Twelve different types of intonarumori were made. Pizzo also describes them: howlers (ululatori); roarers (rombatori); cracklers (crepicatori); rubbers (stropicciatori); hummers (ronzatore); gurglers (gorgoliatori); hissers; whistlers (sibilatore); bursters (scoppiatore); croakers; rustlers; and, noise harmonium. [Additional keywords: acoustic environment, enharmonic bow, enharmonic piano, R. Murray Schafer, Harry Partch, Dada, Marinetti, musique concrete, industrial music, film, Foley sound effects, surrealism, Spike Jones, Pierre Schaefer]

"Letters" 2 pages; 1 drawing.

Susan Rawcliffe warns of health risks in casual use of PVC (polyvinyl chloride), and announces new events relating to her work in ceramic wind instruments. Richard Waters discusses tuning and the difficulty of separating partials of a vibrating body from the resonator; his visual approach to non-traditional and enharmonic tunings and; how water acts to bend tones in his Waterphone. Tim Olsen offers some thoughts on Bart Hopkin's Bentwood Chalumeau. Pearl Bellinger names additional sources for biblical instruments made from natural materials. A sidebar shows the world's tiniest slide whistle made by Jeff Kassel from a medical instrument - a 13-gauge trocar. [Additional keywords: conch shells, animal horns, trumpets, tuning systems]

"Dachsophone" by Hans Reichel. 3 pages; 4 photos, 1 drawing.

The author is an avant garde German guitarist and instrument builder. This instrument uses a flat wood stick clamped to an edge of a table, played with a bow. A curved block of wood fitted with guitar frets - named a "dax" - serves as a "mobile" fretboard.

A sound-box fitted with contact microphone amplifies its sounds, which span a wide frequency range. The sticks are made of ebony, spruce, Brazil pine, mahogany, cedar, plywood, maple, rosewood, sandal wood, persimmon-wood, and African wenge. Each is shaped differently and has its own "personality." Reichel also describes their strange, humorous, fierce and/or tender sounds. [Additional keywords: daxophones, improvisations, animal voices]

"Sonorous Metals For the Experimenter" by Rick Sanford. 3pages.

A helpful introduction to the types, properties, prices, risks, machining tools, and sources for various types of metal. Buying metal requires knowledge of a few general machine terms. Other topics: how to visually distinguish different metals at suppliers (including scrap and salvage yards); how to identify various alloys; cutting, drilling, and filing techniques; hand and eye protection. [Additional keywords: wrought iron, brass, copper, aluminum, steel, bronze, corrosion, thunder sheets]

"Bass Marimbas In Just Intonation" by Denny Genovese. 2 1/2 pages. 2 photos; 1 table.

Genovese describes his redwood instruments, which were inspired by the one built by Harry Partch. Collaborating with artist Tim Treadwell, they designed and tuned them according to Partch's microtonal formula (provided in the article). The article also describes the exciting physical sensation of its low pitches, the tuning process, construction details, the resonators, and the types of mallets they made. [Additional keywords: scales, harmonic series, vibrating bars, xylophones]

"Addendum To Denny Genovese's Bass Marimbas Article" by Tim Treadwell. 1/2 page.

The author provides additional information about his collaboration with Genovese; the equal importance or synthesis of painting, sculptor and sound to his work.

"Organizations & Periodicals". 1 page.

Report on the activities, journals, and newsletters of two organizations devoted to the world of natural sound. Nature Sounds Society is based in Oakland, California. It is concerned with the appreciation and preservation of the sounds of nature, especially animal sounds. Discounting ornithology groups with an interest in birdsongs, it is the only membership organization of its sort in North America. Bioacoustics: The International Journal of Animal Sound and Its Recording is a new academic periodical from Hampshire, England devoted to the scientific study of animal communications and wildlife recordings, and related topics. Subscription, memberships, and contact information provided. [Additional keywords: archives, acoustic ecology, conservation, environments, sound libraries, World Soundscape Project]

VOLUME 4 #4, DECEMBER 1988

"Sound From Stretched Membranes" by Bart Hopkin. 2 1/2 pages; 4 drawings.

Opening thoughts for the feature articles contained in this issue on membranophones, primarily devoted to drums and drumheads, but also including various sound modifiers, transmitters and radiators, vibrational insulators, air reservoirs and blowers, labial reeds, animal skins on string instruments and harps, fiddles, harps, and lutes from South America, Africa and Asia, as well as the intonarumori of Luigi Russolo.

"Letters"

Debbie Suran provides follow-up information on toxic hazards of organic and inorganic materials, from PVC (polyvinyl chloride) pipes and wood, to metals, turpentine, and plastics.

"A Children's Instruments Workshop" by Bob Philips. 4 pages; 16 drawings, 1 photo.

These sketches and pan-ethnic instrument designs by Philips provide information on simple projects and available materials. The instruments span four categories: aerophones; idiophones, chordophones, and membranophones. They include a vessel flute, funnel trumpet, pan pipes, fipple flute, buzzers and hummers, kalimba, conduit tubalong, nail violin, music bow, cigar box lute, bowed tube zither, cigar box lyre, shipping tube bongos, mirilon, conga, and spinning drum. [Additional keywords: classrooms, schools]

"Congas According to Carraway" by Bart Hopkin. 2 1/2 pages; 1 photo, 1 drawing.

Written in consultation with Jim Carraway, a builder of congas for 20 years, this article details the construction of this well-known Afro-Cuban drum with a brief introductory history. [Additional keywords: skins, rawhide, cowhide, shells, exotic woods]

"The Tabla Puddi" by David Courtney. 4 pages; 2 photos, 7 drawings.

Describes the manufacture of the puddi (drumhead) of the Indian tabla, which is made with multiple layers of skin and an extraordinary technique for adding mass to the center of the membrane, without inhibiting its flexibility. The basic structure, names and function of its parts, and construction are described with the aim of giving enough information to make a tabla puddi. [Additional keywords: drums, skins, charts, hides, shai, danyan, banyan]

"Books & Recordings". 2 pages.

A short history and biography of Spike Jones, the popular band leader who collected and used duck calls, sirens, and various

junk noise makers in his hilarious music. Most of the sounds had irreverent, non-musical associations. His stardom lasted from the 1940s to the early 60s. The article includes a short review of "Spike Jones and His City Slickers," by Jordan R. Young, published by Disharmony Books, 1982. The book and also a review of the three record set entitled, "Spike Jones: The Craziest Show on Earth." [Additional keywords: drummers, novelty groups, Vaudeville, slapstick, sound effects]

VOLUME 4 #5, FEBRUARY 1989

"Shape and Form, Contemporary Strings, Part I: Fred Carlson, Francis Kosheleff, Susan Norris, and Clif Wayland" by Bart Hopkin. 8 pages; 9 photos, 6 drawings.

First of a two-part photo and text presentation on the aesthetics of new and traditional string instrument design, highlighting the balance of beauty and function, particularly exotic resonator shapes, multiple necks and bridges, fretboards, saddles, decorative inlays and carving. Pictures and background of a few lesser-known early instruments are included. The brief texts and photos describe a variety of bodies for guitars, dulcimers, lyres, and violins. Shown are hybrid instruments by Susan Norris and Fred Carlson; fiddles, rebec and dulcimers by Clif Wayland; bandura, harp guitar and pyramidulcimer by Francis Kosheleff. Part II appears in Volume 4, #6.

"Letters" 5 pages; 3 drawings.

Charles R. Adams provides additional book titles and comments in response to Tony Pizzo's review of Luigi Russolo's "Art of Noises." Ivor Darreg writes about new scales and tuning devices. Ezra Sims shows his plan to build a 72-notes per octave MIDI keyboard for synthesizer under computer control. Hal Rammel provides additional literary sources on Spike Jones. The editor reprints a paragraph from Rammel's article on Jones' junk yard music in the book "Free Spirits: Annals of the Insurgent Imagination." Peter Fischer offers his experiences on teaching instrument making for children. He details the materials, tools and steps for making a one-string can lute and simple drums, with references to and a diagram of the tuning mechanism of an Ethiopian Krar. [Additional keywords: pedagogy, electric organ, futurism, Jacques Attali, children's instruments, Ernst Bloch, Wassily Kandinsky, rawhide skins]

"More On Fretted Instrument Liberation" by Bart Hopkin. 1/2 page; 1 photo.

This article briefly describes a movable fret system developed by Walter J. Vogt. It has 110 curved fretlets that slide in inserts set into the neck. Their placement makes each string independently tunable, providing new and more precise pitch relationships. [Additional keywords: fretboards, fine tuning]

"Eggshell Instruments" by Bart Hopkin. 3 pages; 2 photos, 1 drawing.

Continuing the series on instruments made from natural materials, Hopkin describes eggshell aerophones: sources and tips on working with chicken, goose, Emu, and ostrich eggs. The article details Robin Goodfellow's diatonic and chromatic octave sets of single-note egg ocarinas, which are suited to hocketing: the communal music making technique. Goodfellow's drawing is of a Chinese hsun, hsuan or xun: an egg-shaped vessel flute made of fired clay. [Additional keywords: finger holes, fipple pipes, globular flutes]

"The Sound Spectrum: Pitch Names, Frequencies, and Wavelengths" by Bart Hopkin. 4 pages.

A frequency chart or graph with staff notation, pitch names, pitch standards, frequencies, wavelengths, and the pitch ranges of musical instruments among other common sounds. The accompanying text briefly explains the differences between just and tempered tunings, how to calculate frequencies and wavelengths for pitches not given in the chart. The text also explains the cents system for measuring relative rather than absolute pitch, the acoustic effects of fundamental frequencies and spectra in musical sounds, and applications for wavelength data. NOTE: This chart had some flaws in it. Improved versions of the chart appears on the EMI Wall Chart, available from the EMI Catalog. Less detailed versions appear in two books, also available from the EMI Catalog: *Musical Instrument Design*, and *Air Columns and Toneholes*. [Additional keywords: waveforms, Hemholtz system, tube lengths, microtones, microtonal, octaves, enharmonic, 12-tone equal temperament, scales, spectral, speed of sound]

"Books: Echo". 1 1/2 pages.

Review of "Echo: Images of Sound" a book edited by sound artist Paul Panhuysen, founder of the Het Apollohuis in Eindhoven, The Netherlands. Published in 1987, the book assembles the writing and photos of twenty artists in the diverse field of contemporary sonic arts in Europe and the U.S., some of whom participated in the Echo Festival I held in 1984-85. This review highlights the work and essays of Hans-Karsten Raecke, Jon Rose, Richard Lerman, Horst Rickels, Rik van Iersel, Joop van Braken, Godfried-Willem Raes, and Hugh Davies. [Additional keywords: festivals, catalogs, catalogues, visual arts]

VOLUME 4 #6, APRIL 1989

"Sounds In Clay" by Ward Hartenstein. 3 1/2 pages; 4 photos.

The author offers helpful information about the composition, firing, and physical limitations of clay in its use for making instruments. General tips on making and tuning clay bells are provided, and the photos illustrate his fountain chimes, shaker chimes,

and the cym-bell tree. These use bell shaped bowls of gradating sizes. His clay marimbas use carefully tuned stoneware bars mounted over a large ceramic vase or resonating chamber. The article also provides details on accurate overtone tuning of the ceramic free bars. [Additional keywords: ceramic idiophones, xylophones, glocken-speils, vibraphones, lithophones]

"Letters" 3 pages.

Richard Waters, inventor of the waterphone, seeks sound designers who can build a small device for boats at sea that will scare whales away from the boat's projected path to prevent collisions. Hal Rammel observes that the wide ranging interest in instrument making touches on a deeper desire to transform the world, and recommends two books by Christopher Small: "Music-Society-Education" and "Music of the Common tongue: Survival and Celebration in Afro-American Music." Bart Hopkin replies to questions on the inclusion of 12-tone equal temperament versus other systems in the frequency chart in Volume 4, issue #5. He also answers questions about doped cloth for drumheads and coconut shells, while relaying information from Tony Pizzo. [Additional keywords: imagination, nature sounds]

"The Nineteen-Tone Instruments of W.A. (Jim) Piehl and Tillman Schafer" by John Chalmers. 3 pages. 2 photos; 4 diagrams.

An article about the microtonal instruments of two San Francisco musician-builders inspired by Joseph Yasser's book, "A Theory of Evolving Tonality." The design, construction and keyboard pitch patterns of their pneumatic 19-tone pipe organ is detailed. Diagrams illustrate the extra nomenclature, positions and colors of the keys. At the time of this article's writing the instruments were being restored by Jonathon Glasier, Ivor Darreg, Erv Wilson, Buzz Kimball, Kraig Grady, and Scott Hackerman. A sidebar describes the correspondences between 12 and 19-tone equal temperament. Piehl's ten-string Hawaiian and electric brake drum guitars are briefly described, as are Schafer's 19 and 31-tone guitars. Schafer also made an electronically actuated microtonal metallophone that used an electric typewriter keyboard and solenoids to propel the strikers. [Additional keywords: fingerings, diatonic notes, timbral stops, pedalboards, accidentals, flats and sharps]

"Shape And Form, Contemporary Strings, Part II: William Eaton, Steve Klein, and Linda Manzer" by Bart Hopkin and Linda Manzer. 7 pages; 12 photos.

Second of a two-part photo presentation on the aesthetics of new and traditional string instrument design, highlighting the balance of beauty and function, particularly exotic resonator shapes, multiple necks and bridges, fretboards, saddles, decorative inlays and carving. Linda Manzer's text describes a multi-neck Picasso guitar she built for Pat Metheny, and others for Bruce Cockburn and Angel Parra. Her guitars use Fishman or piezo pickups, and the sitar-style buzzing bridge on her eight-string drone guitar sounds like a koto. A variety of bridge designs, an asymmetric

bridge and foreshortened upper and lower bouts typify the Klein steel string guitars. Eaton's designs have an affinity with ancient instruments, mythological motifs, as well as forms and shapes from the natural world. [Additional keywords: Jean-Claude Larrivee, harp guitars]

"The Sink: A Found Object Idiophone" by Rick Sanford. 1/2 page.

The author and composer describes the acoustic properties and uses for a stainless steel hospital or restaurant sink. It originally featured in Sanford's percussion compositions, which he describes, and he also describes the various sounds achieved by playing it with mallets, sticks, or bows. [Additional keywords: ready-made instruments, scrap metal, junkyard percussion]

"Books: Three Encyclopedic Sources". 2 pages; 1 drawing.

A review of books that present the world of musical instruments in a comprehensive fashion. The three featured here were more or less up to date and in print at the time of this review, global in scope, presented in convenient formats, and serve as practical desktop references. They are: "Musical Instruments of the World: An Illustrated Encyclopedia," published by Facts On File; "Musical Instruments: A Comprehensive Dictionary" by Sibyl Marcuse, published by W.W. Norton & Co.; "The New Grove Dictionary of Musical Instruments" edited by Stanley Sadie, published by Grove's Dictionaries of Music, Inc. (At the time of this writing, the Grove's Dictionary and "Musical Instruments of the World" have remained in print, while the Marcuse dictionary has gone out of print.)

VOLUME 5 #1, JUNE 1989

Letters and Notes. 2 pages (2-3); 3 photos.

Sam'l P. Arnold: Concerning a "devil's fiddle." R. Gazala: Inquiry (w/photo). Note on Tillman Schafer's 19-tone bars (w/photo). Note on the instruments of Catherine Favre (w/photo).

"Mirlitons - Kazoos and Beyond": Bart Hopkin. 5 pages (4-8); 1 photo; 5 drawings; 2 diagrams.

Concerning mirlitons: instruments with a small attached membrane used to deliberately alter the instrumental sound, generally giving a type of buzzing sound. These range from simple transformers of human singing such as kazoos and comb-and-tissue-paper, through highly sophisticated wind instruments. Many such wind instruments are important instruments in non-Western musics, such as the Chinese di (ti-tzu; also known as the "dragon flute") and Korean taegum. European instruments of this type have included the flauto di voce and sudrophone. Mirlitons usually utilize a non-rigid membrane (a diaphragm) which covers a hole placed somewhere along the length of the instrument. Materials commonly used (past and present) for the membrane

include parchment, other animal skins, paper, onion skin, gold-beaters skin, cellophane, treated silk, etc. The acoustics of mirlitons are discussed. Many examples of "voice mirlitons," "mirliton aerophones," and "mirliton marimbas" - these latter being mirlitons used in resonators for pitched percussion instruments - are described. [additional keywords: bamboo, cantophones, Chopi, eggs, eunuch flutes, garlic juice glue, jug bands, mbila, merlotina, onion flutes, Sudre, trumpet marine]

"The Bamboo Orchestra: Nine Self-Playing Bamboo Machines": Text and diagrams by Ernie Althoff. 5 pages (9-13); 9 drawings. Australian builder Ernie Althoff discusses his self-playing musical machines, made of bamboo sounding elements driven by cassette and turntable motors. From his earliest music-making machine (built in 1981 and utilizing the take-up capstan of a cassette machine as a way to set two suspended beaters in motion, the beaters striking various objects in the vicinity of the cassette machine), Althoff found that the random soundings produced by his designs were ideal for his texture-based compositions. From 1986 onwards, his designs moved to include suspended bamboo as sounding elements. In 1988, his "Bamboo Orchestra" (in which nine different self-playing machines using bamboo were designed to sound together) was developed and, later that year, premiered in Melbourne. Each of the nine machines is illustrated by a line drawing. [additional keywords: 16 rpm, 33 rpm, 78 rpm]

"Hans Reichel's Pick-behind-the-bridge harmonic guitar": Bart Hopkin. 2 pages (14-15); 1 photo; 1 drawing.

Concerning the electric guitar design developed by Hans Reichel during the 1970s, in which string harmonics can be isolated and amplified. Reichel's approach, which uses specially made guitars, is compared with a similar approach of Glenn Briccia, which uses specially made board zithers (for which, also see EMI vol.1 #3). [additional keyword: dachsofon]. A recording (entitled "Thinking") is included on *Experimental Musical Instruments - Early Years*, track 13.

Book Reviews. 4 pages (16-19); 6 drawings from the books under discussion.

Michael Praetorius, trans. David Z. Crookes, *Syntagma Musicum*. Marin Mersenne, trans. Roy E. Chapman, *Harmonie Universelle*. Fillipo Bonanni, intro. by Frank LI. Harrison and Joan Rimmer, *Gabinetto Armonico (Antique Musical Instruments and their Players)*.

"Another Summer's New Year": Bart Hopkin. 2 pages (19-20).

An editorial as EMI began its fifth year of publication. EMI's shift to include more articles and information on non-western and traditional western instruments of interest is mentioned.

"EMI's 4-Year Index" 3 pages (21-23).

An index of articles in EMI volumes 1 through 4, indexed by subject areas.

"The Piatarbajo - Its History and Development": Hal Rammel. 7 pages (1 & 6-11); 5 photos.

Concerning the history of the tradition, primarily in America, of the one-man band. Among the earlier 20th-century artists discussed are Henry "Ragtime Texas" Thomas, Stovepipe No. 1, Daddy Stovepipe, Will Blankenship, Jesse Fuller (who was well recorded), and Fate Norris (who is pictured). The focus of the article then turns to the "five-piece one-man band" called the piatarbajo, designed and built by Joe Barrick of Oklahoma.

Barrick's earliest instrument to be played by the feet (to accompany other instruments played by the hands of the same musician) was the piatar, a foot-activated guitar. Later, in the 1970s, he developed the piatarbajo, which added a bass guitar, banjo, and snare drum. The entire arrangement is then amplified in such a way as to physically separate the various sounds.

Barrick's repertoire is mostly Country and Western numbers. Other instruments designed and built by Barrick, such as the cow's skull mandolin/guitar, the Oklahoma guitar, and the toilet seat guitar, are also discussed and illustrated. [additional keywords: Choctaw; Harlan County, Kentucky; The Skillet Lickers]

Letters and Notes. 4 pages (2-5); 1 photo; 5 diagrams.

Hal Rammel: Concerning the bazooka (the instrument), with a description of the instrument, in response to Bart Hopkin's article on mirlitons in EMI vol.5 #1. [additional keywords: Bob Burns; kazoos; Spike Jones; tailgate trombones; vaudeville] Ernie Althoff: "Regarding Mirlitons," with a description of Althoff's kazoo-prepared alto saxophone (w/diagrams). [additional keywords: PVC] Blake Mitchell: Concerning marimba resonators with membranes, quoting from Frank McCallum's *The Book of the Marimba* (w/diagrams). [additional keywords: Charleo; Marimbero; Nabimba; Tela]

"Spotlite on William Roof": JoAnn Jones. 1 page (11); 1 photo.

A profile of 87-year old William Roof, who earlier in his life built a number of self-designed instruments (hoe guitar, cigar box guitar) and performed as a one-man band.

"Whirled Music": David Toop and Max Eastley. 5 pages (12-16); 2 photos; 16 drawings.

Concerning bullroarers and related whirled instruments and soundmakers, and their influence on the work of English musician David Toop and musical sculptor Max Eastley. Bullroarers have a remarkably wide distribution, and have long had diverse ritual uses; some of these are described in the introductory portion of the present article. The inspiration to create performances of whirled music came to Toop and Eastley through a 1977 London performance by improvising percussionist Paul Burwell. Toop and Eastley's Whirled Music ensemble debuted in 1978, and utilized up to 150 instruments in a performance. These included such swung and spun sound producers as cymbals, Burmese kyeezee percussion plaques, "soft trumpets," a variety of toys, and Eastley's own Darts - a large aeolian aerophone

swung by the player on a cord. At times the soundmakers soaring through the air presented real physical danger to performers and audience alike. Toop and Eastley also describe a few folk musical instruments of Turkey, Vietnam, and Java which involve whirled and circular soundmaking. (This was the first of three articles on "swung" music - music made by instruments that are played by spinning or whirling; the sequels were Sarah Hopkins's "Whirly Instruments" in vol.5 #3, and Darrel De Vore's "Spirit Catchers and Windwands" in vol.5 #4.) [additional keywords: guewova; ngetundo; Curt Sachs; tchouringui; Jean Tinguely]

"A History of Sampling": Hugh Davies. 3 pages (17-19).

A detailed history of sampling - broadly defined to describe all "methods for storing and replaying sounds" - by this scholar of 20th-century musical instruments. Sampling as a digital technique dates back to the late 1930s, under the name of pulse code modulation (PCM). Mention is made of the experiments of Dr. Richard Woodbridge (1960s) in retrieving sounds which were (at various times in human culture) inadvertently "recorded" on the surfaces of clay pots. (The pots, being built up on the spinning potter's wheel, were decorated by means of the pointed stick, and this stick could be considered a recording "stylus," committing sounds in the environment as the pot was being decorated; this could be considered the very earliest form of sonic sampling.) Additional areas discussed by Davies include the phonograph (cylinders, from 1877), the gramophone (flat discs, from 1887), the telegraphone (first magnetic recorder, from the 1890s), early concepts for keyboard instruments utilizing pre-recorded sounds (from the early 1900s), and optical photo-electric soundtracks (from the 1920s). Composers - including Darius Milhaud, Edgard Varese, and Paul Hindemith - experimented with creative use of various of these technologies (especially gramophone records) from the 1920s and 1930s. In 1939, John Cage used manipulated discs in his *Imaginary Landscape No.1*. Magnetic-tape-based composition in the latter half of the century was either directly or indirectly influenced by the work of Pierre Schaeffer (in Paris) from 1948, who initially used disc technology, in 1951 moving to magnetic tape. Work of recent artists such as Laurie Anderson, Michel Waisvisz, and Christian Marclay are also discussed. Experiments with keyboard instruments using pre-recorded sounds continued through the first half of the 20th century, and the first effective such instrument was the Mellotron (later called Novatron), which used magnetic-tape technology and began to be marketed in 1964. Digital technology superseded earlier systems by the early 1980s. [additional keywords: Emile Berliner; Birotron; Chamberlin; Thomas Alva Edison; Optigan; Valdemar Poulsen; Alec Reeves; Singing Keyboard; Vako Orchestron]

"Students' Instrument Ideas": Drawings by Dianne Murphy, Jubal Wilson, Gabrielle Rouse, Jeff Bloom & Daniel Nasaw / Commentary edited from notes by Murray Kapell. 3 pages (20-22); 7 drawings.

Drawings of instrument designs by students at Malcolm Shabazz High School in Madison, Wisconsin, from a class taught by

Murray Kapell and Roan Kaufman, as well as by Daniel Nasaw (age eight).

VOLUME 5 #3, OCTOBER 1989

Letters and Notes. 4 pages (2-5); 2 photos; 5 drawings.

Hal Rammel: Concerning bullroarers and whirled instruments (w/drawings), in response to David Toop and Max Eastley's "Whirled Music" in EMI vol.5 #2. [additional keyword: Andrew Lang] Notes concerning mirlitons and related instruments (w/drawings).

"Sound Frames: Sound Sculpture at the Exploratorium Made by Doug Hollis, Peter Richards and Bill Fontana": Ann Chamberlain. 5 pages (6-10); 6 photos.

Concerning sound sculptures sponsored by the Exploratorium in San Francisco and located in the S.F. Bay Area, made by Hollis, Richards and Fontana, with discussion and illustration of specific works. Each work articulates, acoustically, relationships between listeners and the Bay Area environment. Fontana's Landscape Sculpture with Foghorns is a work which utilizes the foghorns of the S.F. Bay Area. Microphones were placed in eight S.F. Bay locations which picked up the sound of Bay foghorns. The sounds were broadcast in one location at Fort Mason, S.F., with the remarkable result of the actual foghorn sounds forming "echoes" as it were of the broadcast sounds. Doug Hollis, an artist-in-residence at the Exploratorium at the time, created his Aeolian Harp for the front portico of Exploratorium building. Airfoils on the top of the building were connected to metal wires which were acoustically amplified (in a way reminiscent of a tin-can telephone) by metal dishes on the front of the building. Another of the Hollis's works, Wind Organ, was built in front of the Lawrence Hall of Science in Berkeley. In this sculpture, 36 large aluminum pipes were mounted end up in the Berkeley Hills. A slit near the top end of each pipe allowed for the pipe to generate a flute-like edge tone, the various slits facing various directions so that different pipes would sound in breezes of differing directions. Richards's Wave Organ, made in collaboration with George Gonzales, is built on the leeward side of a jetty in the S.F. Bay. Wave Organ acoustically amplifies sound of the water rushing into PVC pipes placed around the jetty. The actual amphitheater of the Wave Organ is built from discarded stonework from the S.F. vicinity. (Reprinted from *Exploratorium Magazine*.)

"Whirly Instruments": Sarah Hopkins. 4 pages (10-13); 5 photos; 1 diagram.

About Australian composer/performer Sarah Hopkins and her performances with "whirlies" - musical instruments made from flexible plastic corrugated hosing. Used in varying lengths and diameters, the material can be precisely tuned and played in both melodic and percussive ways. Hopkins was introduced to whirly instruments in 1982 through a commercially made toy ver-

sion known as a "blugal," given her by composer Warren Burt. Commercially made whirly instruments not being generally available at that time, she soon began making her own whirly instruments by experimenting with swimming pool hosing, 25mm-diameter hosing giving her the "High Voiced Whirlies," with pronounced 3rd through 8th harmonics. Playing techniques include the basic spinning - the "whirling" - as well as percussive rubbings, scrapings, and slappings. In 1984 she formed the six-member Darwin Whirlworks Ensemble. At this time she developed the "Deep Voiced Whirlies," using 32mm-diameter hosing. These provided the 2nd to 6th harmonics, or the 4th to 8th harmonics, depending on length. In 1985 she incorporated some commercially made toy whirlies into her instrumentarium, including the "Plastic Sports Audio Pipes," giving the 2nd to 6th harmonics, which she renamed "Colored Whirlies." At this time she also developed, with kitemaker Sharon Pacey, a soundkite with a whirly mounted on its spine. Later she began to combine whirlies and handbells in performance, as well as collaborating with choreographer Beth Shelton, with whom she created several "Whirly Dances." A recording of Sarah Hopkins's work (entitled "Kindred Spirits") is included on Gravikords, Whirlies & Pyrophones, track 15 (her work is also discussed in the book). (This was the second of three articles on "swung" music - music made by instruments that are played by spinning or whirling; the first was David Toop and Max Eastley's Whirled Music" in vol.5 #2, and the third was Darrel De Vore's "Spirit Catchers and Windwands" in vol.5 #4.) [additional keywords: Frank Crawford; Paul Dougherty]

"What is a Corrugahorn": Frank Crawford. 6 pages (14-19); 1 photo; 1 drawing; 3 diagrams.

A Corrugahorn is "a whole new family of musical wind instruments" invented by Frank Crawford "in the spring of 1973." A professor of astrophysics at the University of California at Berkeley, Crawford became intrigued by the singing whirly tubes (variously known as Freekas, Hummers, and Whirl-a-Sounds) which became popular in the early 1970s, and set out to study their acoustic behavior. Over time he refined a variety of mouth-blown wind instrument constructed from corrugated brass tubing which he dubbed "Corrugahorn." As Crawford describes, the corrugations are what actually generate the tones (which are the natural harmonics of the tube's fundamental), functioning in a way which takes the place of the reed of a clarinet, the buzzing lips of a trumpeter, or the tone-hole edge of a flute. The article goes into much fascinating detail about the development and physics of these instruments. (Reprinted from a 1974 issue of *Berkeley Magazine* with additional material from Crawford's more technical report, "Singing Corrugated Tubes," published the same year in *American Journal of Physics*.)

"John Maluda's Instruments for the Montessori Classroom": Bart Hopkin & John Maluda. 3 pages (20-22); 4 photos; 1 drawing. A study of John Maluda's stringed instruments for young players, inspired by some of the ideas concerning music in education set forth, in the early part of this century, by Dr. Maria Montessori. Maluda's first instrument was a small harp of 23 strings, which

was directly influenced by Montessori's writings. Additional instruments include the 15-string Maluda psaltery, and prototypes for a single string clavichord, as well as a violin and a viola (the latter to be played cello-style by children), each fretted. Each of Maluda's instruments are inexpensive to construct. [additional keywords: Association Montessori Internationale; Carl Orff; Felix Savart]

VOLUME 5 #4, DECEMBER 1989

"Balloons & Bladders": Bart Hopkin. 6 pages ([1] & [16-20]); 4 photos; 6 drawings.

On the uses of "bladders" (inflatable membranes) generally, and balloons (the familiar party toy) as one type of bladder specifically, in musical instruments. Historically, the most important kind of bladder used in instruments is that of an animal. The most common use for an inflated animal bladder has been in bagpipes, as an air reservoir. Bagpipes are sounded by a reedpipe, called a chanter, and usually one or more drone pipes. Air is supplied to these pipes by a bladder which is filled with air either by means of a bellows, held under one arm, or by the player blowing into the bladder itself via a blowpipe equipped with a one-way valve. It is in this way that bagpipes have the ability to play continually without stopping for breath. In addition to animal bladders, other materials such as animal stomachs or entire animal skins have been used, as well as rubberized cloth. Aerophones such as traditional bladder pipes and the modern Pneumafoons of Godfried-Willem Raes are also discussed. Inflated membranes can also be used as resonators of sound in string instruments, although there appears to be only one traditional instrument type that does this: the bladder-and-string, known in its various manifestations as bumbass, basse de Flandre, muzycyny, smyk, and so on. Inflated membrane resonators, vibration insulators and non-rigid mountings have also been used by the Baschet Brothers in France (on their work see EMI vol.3 #3), and by the American builders Tom Nunn and Chris Brown. Balloon drums and Prent Rodgers's balloon flutes are also discussed.

Letters and Notes. 4 pages ([2-5]); 1 photo; 1 drawing; 1 diagram; 2 notations.

Charles Adams: Concerning bullroarers (w/notations), in response to David Toop and Max Eastley's "Whirled Music" in EMI vol.5 #2. Notes on Richard Waters's whale warning device, on a "wind gamelan," and on corrugahorns.

"Musical Strings, Part 1": Bart Hopkin. 7 pages ([6-12]).

The first installment of a detailed two-part article on the physical behavior and acoustics of musical instrument strings of various materials and designs. The article begins with a discussion of the ways in which vibrating strings behave (outlining modes of vibration, internal damping {or, internal friction}, tensile strength, elasticity, and string shape and uniformity), external influences on string behavior, and string design ("the art of deciding just what

sorts of strings will bring out the best in an instrument"). A history of the development of musical strings in Europe is included. ("Musical Strings, Part 2" is found in EMI vol.5 #5.) [additional keywords: overwound strings; sheep gut strings; string winding; transverse vibrations; Young's Modulus]

"Spirit Catchers and Windwands (Music in Circular Motions)": Darrel De Vore. 4 pages ([12-15]); 7 photos; 1 drawing; 1 diagram.

Spirit Catchers and Windwands are, as the subtitle "music in circular motions" suggests, sound-makers which are swung in a circle around the musician - often referred to as "whirlies." De Vore's instruments were initially inspired in the late 1970s by a "Buzzing Bee," a Chinese toy sound-maker utilizing a taut rubber band mounted on a short bamboo, wood, and cardboard frame in the shape of a bee. When swung on a string, a buzzing sound results from this "free-air chordophone." Such an instrument is related to the Aeolian harp, but is, in a way, its inverse, as the Buzzing Bee's "strings" are moved through the air (stationary or not) whereas a stationary Aeolian harp's strings are sounded by air moving through them. (It may be noted that the former - that is, strings moving through stationary air - is generally how scientific experimentation is conducted on the aeolian sounding of musical strings.) De Vore began experimenting with sound-makers constructed on the model of a Buzzing Bee, but of increased size. His discoveries moved to Hummers, D-Trads (Hummers with the addition of bridges), and to Spirit Catchers (complex modular and multiphonic free-air chordophones). All were swung in a circle on a string. Windwands came next, evolving from Spirit Catchers, to which a handle was added so that the direction, speed, and velocity of the instrument could be better controlled in a smaller playing space. Directions, with a diagram, are given for the construction of a windwand. (This was the third of three articles on "swung" music - music made by instruments that are played by spinning or whirling; the first two were David Toop and Max Eastley's Whirled Music" in vol.5 #2, and Sarah Hopkins's "Whirly Instruments" in vol.5 #3; note that Sarah Hopkins has used some of De Vore's instruments in her own performances.) [additional keywords: ArtPark; bullroarer]

"The Protracted History of the Bellow Melodica": Bob Phillips. 2 pages ([20-21]); 1 drawing.

Bob Phillips's ingenious Bellow Melodica was initially inspired by the Irish uilleann pipes, a form of bellows-blown bagpipes. In the Bellow Melodica, an air reservoir bladder bag (pumped under the player's left arm) is fed air from a "ambu bag" (a medical ambu[latory] bag, of the kind used to resuscitate non-breathing individuals, which is pumped under the player's right arm), and in turn supplies air to drive a standard melodica (made by Hohner). Phillips prefers the word "bellow" to "bellows" in his instrument's name, as he says that the sound of the Bellow Melodica brings to mind images of the bellowing of bulls and elephants. (Reprinted from Keep Pickin', the newsletter of the Tri-State Folk Music Society.)

Book Review. 2 pages ([22-23]); 5 drawings.
Hooked on Making Musical Instruments by Lindo Francis and Allan Trussell-Cullen.

VOLUME 5 #5, FEBRUARY 1990

"Musical Strings, Part 2": Bart Hopkin. 8 pages (1 & 14-20). The second installment of a detailed two-installment article on the behavior and acoustics of musical instrument strings of various materials and designs. ("Musical Strings, Part 1" is found in EMI vol.5 #4.) This part covers different string types, and their characteristics and applications. Materials are outlined; these include metal, gut, nylon, silk, animal materials other than gut and silk, vegetable fiber, and unorthodox materials (including coiled and ribbon-shaped strings). Pointers on where and how to obtain strings are also given. A detailed bibliography is included. [additional keywords (mostly musical instruments with unusual string materials): belembautuyan; bin baja; gambus lampung; goras; gusle; kizh; kora; kudam; lesibas; mvvet, panduri; tonkori; valiha; xizambi]

Letters and Notes. 5 pages; 1 drawing; 1 diagram.
Francois Baschet: In response to Frank Crawford's "What is a Corrugahorn" in EMI vol.5 #3. Robin Frost: Concerning a large monochord. Letters from Hugh Davies and Donald Hall on acoustics. Ivor Darreg: Concerning theremins. Notes on bullroarers, bellow melodica, and an illustration of a "cat piano."

"Udu Drum: Voice of the Ancestors": Frank Giorgini. 5 pages (7-11); 6 photos; 1 diagram.
The varieties of clay-pot UDU DRUMS, designed and made by Frank Giorgini, are modeled on Nigerian side-hole pot drums. The Nigerian pot drums go by various names; the one generally ascribed to it is Abang mbre, or "pot for playing." Such ceramic drums are narrow-necked, vase-like vessels with a hole in the side in addition to the opening at the top. The basic playing technique incorporates drumming on the side hole while opening and closing the top hole. Although it is termed a drum it is not a membranophone. Giorgini learned the art of making Nigerian side hole pot drums in 1974 from Abbas Ahuwan at the Haystacks Mountain School in Maine. Giorgini's general UDU DRUM form is that based on the traditional Nigerian techniques. For that form he has developed innovations in design, new formulas for the composition of the clay, and new firing techniques. As with the traditional African concept of a family of four drums, the basic UDU DRUMS are made in sets of four. Giorgini includes much information about the construction, acoustics, and playing techniques of these instruments, and the history of his involvement with them. [additional keywords: Claytone Percussion; Jamey Haddad; Hadgini; hand drumming; Helmholtz resonators; Kim Kim]

"Experimental Musicians: The Next Generation": Joan Epstein. 2 pages (12-13); 3 photos.

Joan Epstein discusses her work with experimental instruments with children in the elementary-school classroom at a Florida school for gifted students aged 8 to 10. Instruments designed by the students sported such names as Grade A Large, Basket Case, Windle, and Four Buttoned Bongo. After structured improvisations, the students went on to compose short pieces for their instruments.

"The Superball Mallet": Richard Waters. 1 page (21); 1 photo; 1 drawing.
On the use of the commercial Superball in mallets for percussive use, and for frictional excitement of resonant objects (or, as Richard Waters quotes Lee Charleton as saying, "it has this friction thing that's unreal"). [additional keywords: The Gravity Adjusters Expansion Band; Shell Mann; Emil Richards; Waterphones]

"The Sound Arts Exhibit at Vista Fine Arts": Notes by Peter Adams / Photos by Sherrie Posternak. 1 page (22); 2 photos. A brief note about a 1989 exhibition of musical instruments at Vista Fine Arts of Middleburg, Virginia. Of the total of 37 instruments, several were of an experimental nature, including Catherine Favre's Magical Moon Harp as well as a number of instruments by Michael Creed (shown in one of the photos). [additional keywords: Sam Rizzetta; Richard Selman; Gary Upton]

VOLUME 5 #6, APRIL 1990

"Resophonics": Introduction by Bart Hopkin. 3 pages (1 & 12-13) A general discussion of resophonics (also called ampliphonics) as applied to non-electric resonating systems on guitars, forming an introduction to Bobby Wolfe's article "The Bluegrass Dobro" on pp.13-18 of the same issue. [additional keywords: Dobro Company; John Dopera; Hawaiian guitars; National Company; resonator cones]

Letters and Notes. 4 pages (2-5); 1 photo; 2 drawings.
Debbie Susan: Concerning traditional accounts of instruments strung with human hair. Bob Grawi & Pip Klein: On bamboo (w/drawing). Matt Finstrom: Concerning a homemade gamelan (w/photo). Tony Blanton: In response (w/drawing) to Bart Hopkin's "Balloons & Bladders" in EMI vol.5 #4.

"Horn from the Sea: Bull Kelp, Part 1": Bart Hopkin. 4 pages (6-9); 6 photos; 1 drawing.
Concerning the construction of trumpets using the seaweed known as bull kelp, found along the Pacific coast of the United States. The long (up to 80 feet), hollow, whip-like plant forms a bulb at its tip. Bull kelp may be found washed up on California beaches, and since its substance is mostly water, it will shrink to a fraction of its size when it dries (if it does not first rot), become rigid and somewhat brittle. Unusual for a natural material, bull kelp provides a well formed conical bore. The bull kelp which has dried successfully may be fashioned into a trumpet, a portion of

the kelp's natural bulb becoming a flared bell. Also, with the addition of a standard brasswind mouthpiece, fresh bull kelp in its natural moist state may also be used as a trumpet. Various lip-vibrated instruments which may be fashioned from bull kelp, including forms with a multiplicity of bells, are discussed and illustrated. Techniques for drying and working kelp, as well as a discussion of kelp "woodwind" instruments, are covered in the second part of the article, in EMI vol.6 #1. [additional keywords: macro cystis; mereo cystis; Monterey Bay Aquarium]

"Plain String Calculations": Cris Forster. 2 pages (10-11); 2 photos.

A technical article concerning plain (not wound) wire strings. Strings of steel, brass, phosphor bronze, and nylon are discussed, and tables giving the weight/volume and average tensile strengths of these materials are given. Forster points out that the musical qualities of stretched plain wire strings are closely related to a set of four acoustic variables, applied to frequency, tension, length, and diameter. The equations are given for solving for these four acoustic variables. It is the nature of these variables that if any three of them are known, the fourth can be predicted. A small amount of fairly basic mathematics is called on in the article.

"The Bluegrass Dobro: America's 2nd Native Instrument": Bobby Wolfe. 6 pages (13-18); 5 photos; 1 drawing; 1 diagram. An article on resonator guitars, specifically the bluegrass-style (wooden body) Dobro. Dobro is a brandname created by John Dopyera (Dopyera) and his four brothers who developed the resonator guitar in the 1920s. They also adapted resonator mechanisms to mandolins, fiddles, banjos, and ukeleles. Much detail is given about Dobro history, acoustics, and construction. (Reprinted, with modifications, from *American Lutherie* #5 (Spring 1986); the original article had additional information on Dobro repair). [additional keywords: Dobro Company; Hawaiian guitars; Hound Dog; Pete Kirby; National Company; Original Musical Instruments (OMI); Replica; resonator cones; Jimmie Rodgers]

Software reviews. 4 pages (18-21); 2 diagrams: *Jl Calc 3.1*; *Microtonal MIDI Terminal 1.107*.

Composing "A Cosmic Koto": Dudley Duncan. 1 page (21); 1 drawing.

Concerning a musical work composed and recorded in the late 1960s, which received Honorable Mention in the 1969 Electronic Music Contest in *High Fidelity* magazine. The work's initial sound source was that of a wire guitar string drawn through a hole in, and anchored to the bottom of, a tin can. Tension on the string, which was plucked, was varied (as in a string drum), and the sound source was recorded by a "prepared" reel-to-reel tape recorder. Using this arrangement, a variety of recordings were made, which were then edited into the final piece. Included (entitled "Cosmic Koto") on *Experimental Musical Instruments - Early Years*, track 18.

Book Review. 1 page (22); 1 drawing.

Jim Leonard & Janet E. Graebner, *Scratch My Back: A Pictorial History of the Musical Saw and How to Play It*.

VOLUME 6 #1, JUNE 1990

"Bugbelly'-A T-rodimba EPB": Tom Nunn. 4 pages (1 & 14-16); 1 photo; 1 drawing.

Tom Nunn writes about another example of his "EPB" - "electro-acoustic percussion boards" - the latest generation being a "T-rodimba," utilizing a series of angled metal rods (which he calls "T-rods") which resonate with complex patterns of harmonics. "Electro-acoustic percussion boards" are a family of instruments, invented and developed by Nunn, that "utilize hardwood plywood soundboards to which are attached various sound-making devices such as threaded steel rods, nails, combs, music wire, springs, highly contorted bronze rods ('zing trees'), and textured surfaces." EPBs are amplified by means of a contact microphone. [additional keywords: FRAP; Mothra]

Letters and Notes. 4 pages (2-5); 2 photos; 3 drawings.

Jerry Brown: On gluing superballs to a wooden dowel. Ward Hartenstein: On gourd instruments and "hand-print intonation" (w/photos). Bob Grawi: On kelp horns, in response to one of Bart Hopkin's designs in EMI vol.5 #6 (w/drawing). Francois Baschet: Concerning the "cat piano" (a query about which was included in EMI vol.5 #5), with a translation and drawings from de Givry's Sorcerer's Museum. Don Wherry: Concerning the 1990 Newfoundland Sound Symposium.

"Towards a Music of the Hyperspheres": Buzz Kimball. 4 pages (6-9); 11 photos; 4 drawings.

Buzz Kimball describes the microtonal instruments he has made. His approach is highly personal and idiosyncratic, motivated to a large part by a reaction against musical conventions, of which he is highly critical (he is also critical of Harry Partch). His move to microtonality was inspired by a 1978 article by pioneer microtonalist Ivor Darreg (p.8). The author is a resourceful, hands-on instrument maker, and the article includes a great deal of construction basics and tips. Stringed instruments, both acoustic and electric, predominate among the instruments he has made, mostly in the form of zithers and slide guitars (he was originally an electric guitarist). Here he also discusses his mallet metallophones. [additional keyword: kanon]

"Horn from the Sea: Bull Kelp, Part 2": Bart Hopkin. 4 pages (10-13); 2 photos; 4 drawings.

The second installment of two articles on the use of bull kelp as a material in musical instruments (the first part having been in EMI vol.5 #6). This section focuses on "kelpwinds," and kelp saxophones (of a tone-color which is "profoundly melancholy"), kelp

oboes, and kelp flutes are discussed. The section on kelp flutes highlights such a flute made by Robin Goodfellow, variously called Mal de Mer and Mal de Meer. Also examined here are techniques - including kelp casting - for preparing kelp for use in making instruments. (A recording of Robin Goodfellow playing the Mal de Meer is included on the CD *Experimental Musical Instruments - Early Years*, track 19, part 2.) [additional keyword: double reeds]

"The Portable Booped Usic Busking Unit Nuclear Brain Physics Surgery School Lab Philosopher's Union Member's Mouthpiece Blatnerphone Hallucinomat": TENTATIVELY, a cONVENIENCE. 5 pages (16-20); 10 photos.

The Hallucinomat is a portable studio for concrete mixing (producing "something akin to 'Musique Concrete' through mixing"), filled with electronics and soundmakers (including tape players, an amplifier, speakers, a television, an amplified cymbal, etc.) and weighing in at 43 pounds. In a series of photographs with captions, Mr. cONVENIENCE walks the reader through a description of the Hallucinomat, its contents, and its setup.

"Editor's Report: And Still Going Strong": Bart Hopkin. 2 pages (22-3).

An editorial "stop-and-take-stock talk" as EMI began its sixth year of publication.

VOLUME 6 #2, AUGUST 1990

"Notes on the Musical Glasses": Ed Stander. 5 pages (1 & 5-7, with an afterword, "The Physics of Musical Glasses" on 7-8); 2 photos; 8 diagrams.

The term "musical glasses" refers to the graduated set of glasses arranged to produce a scale of musical pitches. Most often the glasses are in the form of wine glasses - that is, with narrow stems and bulbous tops. Ed Stander describes in detail his own version of musical glasses. The article opens with a historical sketch of the musical glasses, the European predecessor (circa 1750-70) of the glass harmonica, which appears to have been invented in Ireland by Richard Puckeridge, in 1743. The afterword, "The Physics of Musical Glasses," contains much information on acoustics of glasses. [additional keywords: Angelica; glasharfe; Bruno Hoffmann; Mozart]

Letters and Notes. 3 pages (2-4); 1 photo; 4 drawings.

Ben Saferstein: On building Pythagorean monochords with a high-school physics class. Hal Rammel: In response to a review (EMI vol.5 #6) of *Scratch My Back*, a book on the musical saw. Jeff Brown: A response to the "cat piano" debate, with ideas for additional animal-sound musical instruments (w/drawings). A note from correspondence on gourd Appalachian dulcimers (w/photo).

"A Comparative Tuning Chart": [Bart Hopkin, et al]. 7 pages (11-17); 2 diagrams (including the chart itself on pp.12-13).

The focus of this article is a chart which lays out a variety of tun-

ing systems so that they may be technically compared. The text portions of the article include an introduction and additional notes. Tunings included in the chart and notes are: 5-limit Just Intonation, 12-tone Equal Temperament, Quarter-Comma Meantone / 31-tone Equal Temperament, 10-tone Equal Temperament (with mention of 19-tone Equal Temperament in the notes), Harry Partch's Monophonic Fabric ("Partch's 43"), Ben Johnston's 22-tone Microtonal, Erv Wilson's Just 17-tone Genus (unfortunately, this portion of the chart is not visible in the EMI bound reprint), Blues, North Indian Raga Tunings (Darbari Kanada, Shuddha Kalyan, and Hamsadhvani, with notes by David Courtney), and Central Javanese pelog and slendro tunings (Kanjutmesem, Si Darius (slendro) / Si Madeleine (pelog), and Lipur Sih, with notes by Larry Polansky).

Book & Recording Reviews. 4 pages (18-21); 3 illustrations.

Q. David Bowers, *Encyclopedia of Automatic Musical Instruments*.

Those Magnificent Music Machines (LP of automatic instruments from the collection of Doyle H. Lane).

[author unknown], *The Story of the Violano-Virtuoso: World's Only Self-playing Violin & Piano*.

VOLUME 6 #3, OCTOBER 1990

"Percussion Aerophones": Bart Hopkin. 4 pages (1 & 12-14); 1 photo; 1 drawing.

"Percussion Aerophones," also known as "plosive aerophones," are aerophones in which the column of air is set into vibration percussively, usually by some sort of sudden jolt. The most common and practical form for a percussion aerophone to take is a cylindrical tube. Traditionally, the representative example of a percussion aerophone would be a stamping tube - a tube, sealed at the bottom end, which is tapped against (usually) the ground. Stamping tubes are found around the world, but principally in Oceania. The performance ensemble From Scratch makes extensive use of percussion aerophones, and their creations are discussed extensively in the present article (From Scratch are also featured in an article by Phil Dadson in the following issue of EMI - Vol.6, #4). [additional keywords: bootoo; Darrell DeVore; Music for Homemade Instruments]

Letters and Notes. 5 pages (2-6); 2 photos; 2 drawings; 1 diagram.

Francois Baschet: Further on the "cat piano" (piano a chats; w/drawing). Richard Kassel: A response to Buzz Kimball's "Towards a Music of the Hyperspheres" (EMI vol.6 #1). Colin Hinz: On Nancarrow's player piano modifications. Dennis James: On musical glasses. Cris Forster: On physics of musical glasses (w/diagram), in response to Ed Stander's "Notes on the Musical Glasses" in EMI vol.6 #2.

"The Evolution of an Instrument: A Work in Progress / A Catalyst for Musical Development": Tom Guralnik. 6 pages (6-11); 7 pho-

tos.

Saxophonist Tom Guralnik discusses his "(Not so) Mobile Saxophone and Mute Unit," an array of primarily saxophone-based prepared instruments and instrument modifiers, used in connection with Guralnik's extended-technique saxophone performances. [additional keywords: John Zorn; solo-vac]

"Would String Calculations": Cris Forster. 4 pages (14-17); 2 diagrams.

A detailed discussion of wound musical strings, with much mathematics. Materials discussed are nylon, aluminum, steel, bronze, nickel, copper, silver, and tungsten. This article complements Cris Forster's earlier article in EMI, "Plain String Calculations" (Vol.5, #6), concerning plain (not wound) wire strings of steel, brass, phosphor bronze, and nylon.

"Conceptual Instruments": Douglas Kahn. 4 pages (17-20).

A discussion of theoretical instruments, which "perform for the inner ear," described in several late 19th- and early 20th-century French and Russian writings. The French writers include J.K. Huysmans (from his novel, *A Rebours*, 1884), Auguste Villiers de l'Isle Adam (*L'Eve Future*, 1885), Guillaume Apollinaire (the story "The Moon King," 1916), and, especially, Raymond Roussel (*Impressions of Africa*, 1910, and *Locus Solus*, 1914). The Russian Futurist Velimir Khlebnikov is also discussed; his remarkable conception, the oracular lyre of Ka, is detailed in his short story "Ka," of 1915. Some of the conceptual instruments described may well be practically realized, but generally that would not be possible, nor should it be: "by performing for the inner ear, they [conceptual instruments] stretch listening abilities." [additional keywords: Rene Ghil; Arthur Rimbaud; synaesthesia]

Book Reviews. 3 pages.

Boethius, trans. Calvin M. Bower, *Fundamentals of Music (De institutione musica)*.

Floris Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650*.

VOLUME 6 #4, DECEMBER 1990

"Playing Music with Animals: Four Passages from Dolphin Dreamtime": Jim Nollman. 5 pages (1 & 6-9); 4 photos. Excerpts from the book, *Dolphin Dreamtime: The Art and Science of Interspecies Communication* (Bantam Books, 1987), by Jim Nollman, who works in the field of musical interaction with animals. His musical explorations include work with a variety of different land and sea animals. In addition to the excerpts from his book, specific musical instruments he has used are discussed here. One is Dolphin sticks, the "aquatic equivalent" of the Latin-music clavès, made of ironwood and played underwater (audible even to humans at 50 yards). Another is the Waterphone, Richard Waters's friction-sounded rod instrument (it is shown in one of the photos in this article, and discussed elsewhere in EMI). The Whalesinger drum is a "floating boat-instru-

ment," shown in two of the photos in this article, and discussed in the second excerpt. Jim Nollman also uses an electric guitar, the sound of which is projected underwater. Also discussed is his underwater sound system. [additional keywords: Interspecies Newsletter; SeaAcoustics; Spiritual Ecology; tulke; tepanatzli]

Letters and Notes. 4 pages (2-5); 3 photos; 2 diagrams.

Michael Meadows: Some notes on musical glasses (w/diagrams) in response to Ed Stander's "Notes on the Musical Glasses" in EMI vol.6 #2. Tom Baker: In response to the "A Comparative Tuning Chart" in EMI vol.6 #2. Photos from Colin Hinz of a Paris street orchestration.

"From Scratch-A Background Introduction": Phil Dadson. 4 pages (10-13, with an appendix "Instructions for Making Tuned Bamboos"); 2 photos; 4 drawings; 1 diagram.

A detailed article on the New Zealand experimental instrument ensemble, From Scratch. A number of their principal instruments are described: end-struck pipes (racks of large PVC {polyvinyl chloride} pipes, each struck over the open end with a ping-pong-paddle-like bat), tuned tongue bamboo (bamboo tongue drums, inspired by the boo of Harry Partch), tuned chimes (generally utilizing commercially available chimes), and tuned drums (rototoms). Included is an appendix, "Instructions for Making Tuned Bamboos." [additional keyword: lexan]

"Artspirit Sings": Lynn Slattery Hellmuth, with additional notes by Tiit Raid, Enrique Rueda and Mary Michie. 4 pages (14-17); 12 photos; 1 drawing.

"Artspirit Sings" was an exhibition of musical sculptures which toured the state of Wisconsin during the early 1990s, inspired by a desire to develop an exhibition of sound sculpture that would make art accessible to the visually impaired. The exhibition included interactive musical sculptures as well as concert performances on additional pieces. Illustrated are a variety of sculptures by Lynn Slattery Hellmuth, Tiit Raid, Truman Lowe, Enrique Rueda, Mary Michie, and Eric Saunders-White.

"The Matzaar and Aliquot Tone Scales": H. Barnard. 2 pages (18-19); 1 photo; 1 diagram.

H. Barnard discusses the matzaar, a rebuilt acoustic guitar (pictured) which is designed to be played in aliquot-12 tuning, and another rebuilt guitar designed to be played in aliquot-19 Shoureek-tuning (a just 19-tone system). [Aliquot tunings arise in fretted strings when the frets are equally spaced.] The accompanying diagram gives intervals for aliquot-2 through aliquot-16 systems. He makes reference to an earlier article, "Kayenian Musical Instruments," in EMI vol.3 #1 (June 1987), as well as to additional articles in the periodical *Bouwbrief*. These various articles discuss the musical instruments of the imaginary Kayenian Empire. [additional keywords: Intooseel; Matz; Vvk-foundation]

Book Reviews. 2 pages; 7 drawings.

Martha Maas and Jane McIntosh Snyder, *Stringed Instruments of Ancient Greece*.

VOLUME 6 #5, February 1991

“The Diddley Bow in a Global Context”: Richard Graham. 3 pages (1 & 10-11); 3 drawings.

The diddley bow is a monochord zither (also called jitterbug or one strand) played in some African-American communities in the south and southeastern United States (now rare). It is “glissed” - that is, the string is fretted by a bottle, and pitches are played in glissando. This article is an examination of the instrument’s African precursors, as well as of other glissed zithers and glissed musical bows found in Central and South America. [additional keywords: benta; berimbau de bacia; carangano; kambulumbumba; mitote]

Letters and Notes. 4 pages (2-5); 7 photos; 1 drawing.

Ed Stander: Stander’s response to various responses to his Stander’s “Notes on the Musical Glasses” (EMI vol.6 #2). Hugh Davies: Further re the “cat piano” and related instruments (including the “pig organ”). Bill King: About his stringed instruments (w/photo). Notes on the pyrophone and “nose flutes.” Ben Saferstein: On his PVC instruments (w/photos).

“A Personal System for Electronic Music”: David Myers. 4 pages (6-9); 1 photo; 1 diagram.

In this article, reprinted from the English ReR Quarterly, David Myers discusses alternatives to mass-market systems of electronic music components, and describes his own electronic “personal music system,” producing what he calls “The Feedback Music.” The system involves several digital delay units and a mixer which allows you to bounce stray sounds between the delay units with extraordinary and surprising results. The article includes a side-bar sub-article “About Time Delay.” [additional keywords: DX7; MIDI; modular synth]

“Sounding Bowls — The search for harmony: Sound into form — form into sound”: Tobias Kaye. 4 pages (12-15); 7 photos; 1 diagram.

Irish-born woodworker Tobias Kaye discusses his stringed instruments made with turned wooden bowls. Five different sounding bowls - made of apple (Sounding Bowl #1), cherry (#24), rippled brown ash (#25), spalted sycamore (#29), and sycamore (#30) - are pictured and described. Pictured as well are an aeolian bowl (rippled brown ash; in which strings are struck with wind-blown beaters) and the acoustic bowl (rippled ash; the very bowl which set him wondering about making instruments from bowls; as he says, “The idea of putting musical strings across a bowl occurred to me one night while I sat on the side of my bed trying to think of other things”). [additional keywords: David Pye]

“More on Corrugated Horns”: Bart Hopkin. 2 pages (16-17); 1 photo.

A sequel to two earlier articles on corrugated horns (defined as

“wind instruments using tubes with regularly spaced lateral ridges”) in EMI vol.5 #3: “Whirly Instruments,” by Sarah Hopkins, and “What is a Corrugahorn,” by Frank Crawford. Here Bart Hopkin reports on his own experiences with designing and constructing such instruments, including the multiple corrugahorns shown in the photo. [additional keywords: Richard Waters]

“The Verrillon, the Glass-Organ, a New Glass Harmonica, and Other Historical Glass Instruments”: Sascha Reckert. 3 pages (18-20); 4 photos; 7 diagrams.

An article on two glass instruments (the verrillon and the glass organ) designed and built by Sascha Reckert, as well as a discussion of three late 18th-century glass instruments (Ernst Chladni’s Euphon and Clavicylinder, and Christoph Friedrich Quandt’s Neue Harmonika) which were inspirations for the author’s own glass instruments. Diagrams are given of the sounding elements of the various instruments. [additional keywords: Bruno Hoffman; Gläserspiel; Glasharfe]

“The Smell Organ”: Joseph H. Kraus. 2 pages (21-22); 1 drawing.

Reprinted from *Science and Invention* (June, 1922), this article discusses an organ designed by the French chemist Dr. Septimus Piesse to combine sounds and smells in a “harmonized” way, with correspondences ranging from contrabass C (equated with patchouli) to soprano f (equated with civet).

Book Review. 1 page (22).

A History of the Music Industry (special issue of *The Music Trades*).

VOLUME 6 #6, APRIL 1991

“The Acoustisizer”: Bob Fenger Icon. 6 pages (1 & 4-8); 8 photos; 4 diagrams/drawings.

“The Acoustisizer (ACU), simply defined, is a miniaturized prepared piano with guitar pickups and speakers built into the unit, capable of producing prepared piano-generated feedback loops, sympathetic vibration processing and sound-stimulated kinetics.” Thus begins Bob Fenger Icon’s description of his complex updating of the prepared piano. Photos of the Acoustisizer during construction, as well as diagrams and drawings, illustrate this detailed article. [additional keywords: ARP Odyssey; Richard Bunker; The Well Prepared Piano]

Letters and Notes. 2 pages (2-3); 2 drawings.

Tony Blanton: Concerning homemade instruments. Ivor Darreg: Concerning announcements of tracks on cassettes. A score of “cat music” supplied by Hugh Davies.

“Tuning for 19 Tone Equal Tempered Guitar”: Bill Sethares. 3 pages (9-11); 4 diagrams.

A practical article on the ins and outs of a guitar fretted in 19-tone equal temperament. The article includes three tuning

schemes ("The All Fourths Tuning," "The Accidental Tuning," and "The Open Minor 7th Tuning") as well as scale and chord charts.

"Conjoined String Systems": Bart Hopkin. 4 pages (12-15); 11 drawings.

The first of two installments on conjoined strings, this article introducing systems of multiple conjoined strings and discussing the acoustics of such systems. Addressed are three-string and four-string systems, as well as possibilities for multiple-string systems. (Note that two strings connected end-to-end behave as if a single string.) Includes a side-bar mini-article, "2-String System Simulations, and Related Approaches to inharmonic strings."

"Ten-foot Fiddles and Two-story Harps": Edwin Teale. 3 pages (16-18); 6 photos.

Reprinted from Popular Science Magazine (1938), this article explores the remarkable instruments designed and constructed during the second quarter of the 20th century by Arthur K. Ferris, a Flanders, New Jersey, landscape gardener, during his spare time. The "two-story harp" of the title refers to an enormous harp, with a cello-shaped body, which required 8-foot-long strings and a raised platform for playing. A photo of the instrument is included - the bottom-end of the instrument near the camera, and Mr. Ferris, off in the distance, plucking the higher strings. Of interest is Ferris's unusual choice of woods for his instruments, including such woods as sassafras, tulip, thuja [thuya], crab apple, and poison sumac. Additional instruments include the "whispering harp" (shown being played by Mrs. Ferris), the "bridal lap harp" (a combination violin and harp, shown being played by two players), three "violinettes," and the "suitcase viol" (a large bass viol with a rectangular body which doubles as a carrying case for smaller instruments).

Book Review. 1 page (19).

Frederick R. Newman, *Mouthsounds*.

"Patenting for Musical Instruments": Bart Hopkin. 4 pages (20-23); 1 drawing.

A article on practical issues relating to patenting instruments, including a general discussion on patents, the procedures for obtaining a patent, and the necessity (or lack thereof) of having an instrument patented. A short list of relevant U.S. government offices and helpful books is included.

VOLUME 7 #1, JUNE 1991

Letters & Notes. 2 pages.

In response to an article by David Myers' feedback systems, Henry Lowengard notes the interactive possibilities of pitch shifting devices and harmonizers. Francisco Lopez sends a note on his city soundscape compositions. Ivor Darreg sends a note on regretting following Bill Sethare's article on 19-tone equal tem-

perament for guitar. Listing of EMI's newest cassette tape containing recordings of featuring instruments that were featured in EMI Volume 6. Articles and interviews featured in the Canadian music journal Musicworks issue #49 are described, particularly "Sounds of Invention," an exhibition of new instruments and their builders: Sylvia Bendza, Bill Napier Hemy, Gordan Monihan, Ushio Torakai, Nicolas Collins, among others.

"Computer Control for Acoustic Instruments" by Bart Hopkin, with Alec Bernstein and Alistar Riddell. 3 1/2 pages; 6 photos.

An article on computer-activated instruments with an emphasis on electro-mechanically-played pianos. Its historical overview mentions various manufacturers, composers, instruments, and inventors, such as Conlan Nancarrow, Disklavier, the Marantz Pianocorder, Richard Teitelbaum, and Trimpin. Following the overview is a closer look at the work of three composers, Alec Bernstein with Daniel Carney, who work and perform together under the name Aesthetic Research Ensemble, and Alistar Riddell's Meta-Action project. *(An earlier article in EMI, August 1990 also focused on player pianos.)* [Additional keywords: microcomputers, piano rolls, keyboard, programming, MIDI, damper, hammer, controllers, software, solenoids, interactive systems, machine control, digital performance]

"The StarrBoard" by John Starrett. 3 pages; 4 photos, 1 diagram.

The author reports on his motivation and construction of this easy-to-play instrument, which is based partly on the form of a guitar but also on harps and zithers. It is played using a finger tapping technique called "hammering on," as with the Chapman stick. It is essentially a very wide guitar neck with 32 strings and 24 frets. Acoustic, electric, and MIDI versions are illustrated. It can be played in just, meantone, or other unequally spaced tunings. The article covers construction materials, tuning, and playing technique. [Additional keywords: scale patterns, soundboards, keyboards]

"Driftwood Marimbas" by Bart Hopkin. 1 page; 2 photos.

Hopkin's article gives step by step instructions for assembling a marimba on the beach, without the use of any tools and hardware. Tips are provided on finding, selecting, and combining wood pieces. [Additional keywords: xylophones, sounding bars, idiophones, glockenspiels, vibraphones]

"Conjoined String Systems: Reports From Builders" by Mario Van Horrik and Paul Panhuysen. 3 1/2 pages; 3 photos, 4 drawings.

(see also EMI Volume 6 #?) The authors describe their use of very long string instruments in a way that merges the elements of sound, dance performance, and visual art on an architectural scale, particularly with multiple strings that are attached directly to one another. With text, photographs, and drawings, Van Horrik describes three constructions that use guitar strings, piano wires, rope, and elastic cords to either conduct vibrations or electric current, or both, while motors and piezo transducers produce and amplify vibrations. Overtone patterns are their outstanding sonic feature, sometimes varied by the combination of transverse

and longitudinal vibration. In his "The Bird's Mouthpiece" springs, hinges, amplifiers and feedback are also used. Panhuysen's many installations are multiple-string systems conceived with their visual result first, and are always related the architecture of the space. Tuning systems and techniques are also described. [Additional keywords: piezo pickups, Maciunas Ensemble, Het Apollhuis, Eindhoven, Netherlands, Ellen Fullman, springs]

"A Day in the Patent Library" by Bart Hopkin. 3 pages; 5 drawings.

(see also EMI Volume 6 #? And volume 4 #2) In a patent search intended to find other instruments similar to a variable-pitch wind instrument design of his own, the author finds three related variable-pitch wind instrument designs. The transverse flute by Jeffery L. Lewis is similar to the author's own glissando clarinet, the Bentwood Chalumeau. His other finds are patents for a wind instrument with helical frequency determining means by John W. McBride, and a slide saxophone by Martin Juhn. The text describes the principles indicated by the drawings. Also, a drawing of the Hopkin's own instrument illustrates its slit-tube design. Additional keywords: law, lawyers, legal, tubes, tone-holes,]

"Book Review: Het Apollhuis 1985-1990" by Bart Hopkin. 1 page. Review of a retrospective catalog of exhibits and performances at this Dutch center for the multidisciplinary exploration of art based mostly in sound. Founded and directed by Paul Panhuysen in Eindhoven, The Netherlands in 1980, Het Apollhuis has played a leading role as a presenting organization, a research center, and a publisher. The catalog documents a large number of installations, events, and concerts by over 400 artists in hundreds of photos and brief texts. It is a follow-up to an earlier catalog documenting the center's first five years of activity. Hopkin adds brief descriptions of the work by these documented artists: Gunter Demnig; Rolf Langenbartels; Nicolas Collins; Pierre Bastien; Nico Parlevliet; Ron Kuivila; Mark Laiosa.

"Editor's Annual Report" by Bart Hopkin. 1/2 page. The author reviews past accomplishments and other prospects for future Experimental Musical Instruments publications.

"EMI's 6-year Index." 2 1/2 pages. A subject index for articles that have appeared in Experimental Musical Instruments since it began publication in 1985. Articles are listed under 49 primary topics; passing references are not indexed. This early index has since been superceded by the listing you're reading now.

VOLUME 7 #2, SEPTEMBER 1991

Letters. 3 pages.

Hal Rammel offers some text on Edwin Teale's oversized fiddles and harps. Hugh Davies mentions cat organs and Colin Hinz discusses mechanisms in computer-controlled instruments. On play-

er pianos, Steve Peters talks about the Musée de la Musique Mécanique in Paris. Skip La Plante briefly describes an Indonesian instrument that resembles rubber bands stretched around a shoebox. Other mentions are ornate kalimba instruments by Nadi Qamar, Dali's melting clock, music access national network, and the May 1991 issue of Ear magazine's focus on environment.

"Famous Early Color Organs" by Kenneth Peacock. 4 pages, 4 photos, 2 tables.

This history examines early attempts by philosophers, poets, painters, scientists, and musicians to understand the relationship of color- and light-perception to sound and music. The eighteenth century mathematician Louis-Bertrand Castel published plans for a clavecin oculaire, an instrument based on Isaac Newton's theory that the perception of color and sound were physically analogous, e.g., that light waves and sound waves at different frequencies exist on the same physical spectrum. In the nineteenth century techniques using electricity, flames, and mechanics, instruments for projecting colored light were developed. A forerunner to modern lighting and projection systems, Bainbridge Bishop's concept for painting music led to a light-producing device using shutters and levers. Frederick Kastner's Pyrophone ignited gas jets into crystal tubes and reportedly produced sounds like human voice and orchestral along with its visual display. Among the best known is the Colour-Organ which Alexander Wallace Rimington patented in the late-nineteenth century. It was called for in Alexander Scriabin's famous 1911 color-symphony, Prometheus, the Poem of Fire. The tables show differing ideas of how colors of the light spectrum should correspond to notes of the chromatic keyboard. [Additional keywords: acetylene, aural, synesthesia, filters, chroma, hue, intensity, multi-media, prism, optical, rheostats, stereopticon]

"Earthsounds" by Ragnar Naess. 2 pages; 6 photos. The author tells about his role as visual designer, potter, and clay technician in collaboration with Chinese composer Tan Dan and producer, Mary Scherbatskoy for Tan's opera performance at the Guggenheim Museum, New York. Classifications of sound in traditional Chinese music are described as well as the conceptual process and the technical system developed for the ceramic instruments. The article details the material composition and resonant properties of fired clay and glazes. The results take the form of gongs, cymbals, flutes, horns, drums, and stringed instruments in both a visually and aurally attractive and functional way. [Additional keywords: gamelan, shrinkage, minerals, Jade Bells, jars, jugs, bowls, bottles, tone holes, kalimbas, neck, pottery, stoneware, Taoist, trumpets, vase, vessel, visual design]

"Cans and Springs and Bars and Plates and Wheels" by Peter Whitehead. 2 pages; 5 photos, 1 diagram. Whitehead's instruments use readily available materials, simple construction methods, and have the appearance of junk sculpture. These are described in the notes accompanying each of the five instruments pictured. Their names partly describe their mate-

rial constitution. The Channel Bars is basically an aluminum xylophone. The Single Bar consists of a steel bar resting on two balloons. The Can-Can is a hanging construct suspended by coil springs. In addition to a bicycle wheel Spoke-Speak also uses metal bowls and a garbage can, and The Metal Cone is a free-standing construction using circular metal plates. The notes also describe playing techniques and their sounds. [Additional keywords: recycling, idiophones, percussion]

“Ferdinand Försch: Sound Images and Other Sound Works in Metal, Wood, and String” by Iris Tenge. 4 1/2 pages; 9 photos. Försch’s new instruments have an equal connection between their sonic function and visual form. Construction materials and component parts are listed beside each of eight instruments in this photospread. Many use a combination of finely cut, shaped and machined wood, brass, steel, copper and aluminum supports, bridges, strings, bars, rods, and resonators. Some instruments appear in the form of slit drums, while others are hybrid combinations of percussion and stringed instruments. [Additional keywords: idiophones, percussion, sculpture]

“Conjoined String Systems: More Reports From Builders” by Jeff Kassel, Tom Nunn, and Bart Hopkin. 2 1/4 pages; 3 photos, 1 drawing.

A follow-up article to one published in EMI Vol. 7 #1, June 1991. The instruments discussed here use standard string lengths rather than very long ones, to produce more conventionally playable instruments. Kassel’s Tritar and his plans for the three-sided Trila-Trarp, as well as Hopkin’s Trillium Cluster are pictured. Nunn describes three ways to conjoin strings and the resulting tones and overtone relationships. One system employs a knitting needle, another a washer, the third a conical radiator in place of a washer. [Additional keywords: harps, sounding boxes]

VOLUME 7 #3, NOVEMBER 1991

Letters. 3 pages; 2 photos.

Alistar Riddell, author of a previous article on electro-mechanically played pianos, responds to Colin Hinz’s question about unwanted mechanical noise. Two photographs and a brief letter describe Balanced Beams, a sound sculpture by Ernie Althoff using a bamboo support structure, aluminum bowls, suspended shells, and swinging poles. Ivor Darreg writes about the piano’s status and obsolescence. [Additional keywords: computer controllers, installations, solenoids, circuit design, history, furniture, recycling, piano actions]

“Membrane Reeds: Indonesia and Nicasio” by Bart Hopkin. 5 pages; 3 photos, 7 drawings.

An article on the author’s solution to alternative reed types for use in wind instruments. Single and Double reeds, such as those used in clarinets and oboes, have a mechanism for converting a steady air stream into a series of rapid pulses which vibrate at the tube’s resonant frequency. The labial reed system uses a bal-

loon neck pulled over the rim of a tube, which provides an effective way to create pressure-responsive gating of an air stream. The article addresses design issues of pitch stability, pitch range, tube lengths, spacing of toneholes, tuned air columns, air chambers, pipes, and airflow. Accounts from Saul Robbins and Jack Body describe similar instruments made and used in Java and Sumatra. These are made of discarded plastics, namely film canisters and cellophane membranes. [Additional keywords: aerophones, mouthpieces, lips, diameters, blow tubes]

“Famous 20th Century Color Instruments” by Kenneth Peacock. 5 pages; 7 photos.

This article continues the extensive history that began in “Famous Early Color Organs,” which appeared in EMI’s September 1991 issue. Resuming with Alexander Scriabin’s color-symphony Prometheus, the Poem of Fire, the author describes the attempts at inventing a machine to effectively realize his color score, such as the Chromola, as well as accounts of its various performances. The associations between pitches and corresponding colors were often debated. Some inventors claimed therapeutic benefits from their color music. Mechanical and electrical operations of the many instruments are described. Particular attention is given to the development, construction, and concert performances with Thomas Wilfred’s Clavilux, an instrument that used prisms, disks, and filters to project light to form geometric shapes on a screen. Wilfred notated his light scores and the performances of his Lumia Suite possessed dramatic effects. This historical account concludes with a description of Frederick Bentham’s Light Console and recent laser light shows and kinetic art. [Additional keywords: acetylene, aural, synesthesia, filters, chroma, hue, intensity, multi-media, prism, optical, rheostats, stereopticon]

“Ukeful Ideas” by Brian Stapleton. 2 pages; 5 photos.

Various ukuleles are shown and briefly described, all built by the author, a London-based instrument restorer and luthier. [Additional keywords: Polynesian, wood]

“The Devil’s Fiddle: Past and Present” by Hal Rammel. 3 1/2 pages; 2 photos; 5 drawings.

Part one of a two-part article; this part describes the history and curious culture of this instrument. A simple and usually self-built instrument consisting of a stick and a single string. Variations of it are found through history and in many continents. Frequently used at taverns, street festivals, parades, and carnivals, it likely served as noise device and may be a crude cousin of the refined Tromba Marina. It goes under many names: bladder and string, Teufelsgeige, bumbass, ozembouch, nun’s violin, stick zither. In some manifestations it was topped with a carved clown’s head, sometimes with bells, wood block, and drum attached, and played with a notched bow. [Additional keywords: bowed chordaphones, idiophones, scepter, street musicians, folk music, entertainers, carnivals, circuses, clowns, dance, drums, Stumpf

Fiddles, vaudeville, bumbass, rumsterstang, krigsdjaevel, museums, musicking, notched bows, vernacular, washboards]

VOLUME 7 #4, JANUARY 1992

Letters & Notes. 4 pages.

Stephen Malinowski, developer of a scrolling, sound synchronized, bar-graph score for listeners called the Music Animation Machine, responds to Kenneth Peacock's article on Famous Early Color Organs. François Baschet provides a drawing, photo, and observations on the slide clarinet, namely a helical telescoping mechanism, as well as patent information. [Additional keywords: colors, hue, intensity, light receptors]

"Why Build Instruments?: An Account of a 7 Year Process to Overcome Exoticism" by Guy Laramée. 2 pages; 6 photos. This article describes TUYO, a Canadian music ensemble who perform with self-built metalophones, tuned shakers, accordions blown by foot-operated bellows and aluminum tube xylophones. The group is devoted to Harry Partch's idea of "corporeal" music, one that is visual, gestural, and microtonal. The article discusses theatrical staging of large-scale events, touring with heavy instruments, the aesthetic concerns with physicality and presence. Instruments pictured are the harmonium, Métalo, Tubes, Léléphant, Galère, and Tortue. [Additional keywords: Montréal, theater, opera, just intonation]

"John Hajeski's Portable Anarchy" by Mike Hovancsek. 1 1/2 pages; 3 photos, 1 diagram
Hajeski built several homemade electronic instruments by modifying circuit boards of car radios and Walkmans. The article suggests that anyone with an old radio, soldering tools, and ammeter can add normally-open switches to the key transistor that effects tone control, and tuning, to create their own Kraakdoos, or "cracklebox." The analog sounds produced are more earthy and shifting than more complex digital instruments. [Additional keywords: cracked, hacked, circuit bending, contacts, foot switch]

"My Life... For A Sound... If the Tune Begins With A YOU" by William Louis Soerensen. 4 1/2 pages; 14 photos
The author writes about his large-scale projects that integrate environmental sound sculpture, outdoor and indoor sound installations, and one string instrument. Seven works are pictured and described which have been built and exhibited internationally. Their design and structure integrate visual and acoustic functions with environmental conditions, either by combining readily available manufactured materials and devices with natural materials, tree branches in one example, or by using naturally occurring light, wind, and water energy. One of his intermedia works combines multi-channel tape loops and electronic tone generators with projections, photocells, and ultrasound transmitters. Another temporary sidewalk installation was intended for as many as one hundred pedestrians to play at once. The other projects incorporate existing soundscapes, parabolas, landscape, architecture,

standing air columns, revolving tubes, reflective thunder sheets, gardens, pile drivers, and the ecology of chosen sites. The artists also discusses the broader historical and cultural issues and motivations behind his efforts. [Additional keywords: audience interactions, bottles, locations, site specific, solar activated, strings, tidal actions, resonators]

"Sound, The Re-conquering of Space and Slow Time: Some Reflections on the Sound Sculptures of William Louis Soerensen" by Jean Fischer. 1/2 page.

This article places Soerensen's work within a historical context, particularly in relation to modern and postmodern paradigms. The author defines and classifies his work in six categories, typified by the work of other artists or trends: Dadaist machines; extended or homemade instruments; soundscapes; New Age and nature-idylls; wind-harps.

"The Devil's Fiddle: Past and Present, Part Two" by Hal Rammel. 5 pages; 9 photos, 1 drawing

The second half of Rammel's report on the history of this string and percussion instrument, which is found in diverse forms and under various names throughout Europe, North America, and beyond. Part one (see VOLUME 7 #3, NOVEMBER 1991) traced the early history, evolution, and curious culture of this instrument. Part two focuses on the fiddles more recent history of its players and makers. [Additional keywords: bowed chordaphones, idiophones, street musicians, folk music, entertainers, carnivals, circuses, clowns, dance, drums, Stumpf Fiddles, vaudeville, bumbass, rumsterstang, krigsdjaevel, museums, musicking, notched bows, Peripola, vernacular, washboards]

"The Aerophor-A Breath Saving Device" by Margaret Downie Banks. 1 1/2 pages; 4 photos

Reprinted with permission from the Newsletter of the American Musical Instrument Society, written by the curator of The Shrine to Music Museum, describes a tone-sustaining device for wind instruments invented by German flutist, Bernhard Samuels in 1911. Its purpose was to artificially supply an uninterrupted airflow to his or her instrument. It used a foot- or arm-operated bellows to force a continuous air supply, heated by an electric lamp to player's breath temperature, via a rubber tube held in the player's mouth. According to the inventor this also provided certain health and hygienic benefits. [Additional keywords: air pressure, breath controllers, circular breathing, embouchures, wind passages, extended techniques, tubes]

VOLUME 7 #5, APRIL 1992

Letters & Notes. 4 pages; 5 photos, 3 drawings

Jeff Kassel supplies photo of a Rain Chime manufactured by AG Industries in Redmond, Washington. Ernie Althoff comments on the Cat Organ. François Baschet responds to Ivor Darreg's article on piano harps in the Piano Reincarnation Project (Volume 7 #3), labial reeds and the Pathé Brothers' loudspeaker used the

early 1900s, comparing it to a 1940 US Army patent for the same design. Colin Hinz offers information and photos of his electro-mechanically operated piandemonium, and responds to Alistar Ridell's comments (Volume 7 #2 and #3) about noise and sole-noids. Notes on Jew's Harp Festival, Instruments of Sound exhibition, Leonardo Music Journal, Sound Symposium, Melody Chups candy, and plastic water bottle congas.

"The Instruments of Qubais Reed Ghazala" by Mike Hovancsek. 2 pages; 6 photos

A brief biography and introduction to work of the inventor and well-known proponent of circuit bending. Later issues of EMI featured the series of articles Q. R. Ghazala wrote on his discovery, philosophy, and techniques of circuit bending. Five of his interactive, bio-modulated electronic instruments are shown here, the Photon Clarinet; Harmonic Window; Solar Bug Box; L' esprit En Piege; and The R.A.P. (Readily Available Phonemes). Components used include tone generators, digital samplers, solar cells, photo-cells, microprocessors, typewriter keyboard, and voice synthesizers. [Additional keywords: cracked, hacked, body contacts, switches]

"Bridges: An Indian Perspective" by David R. Courtney, Ph.D. 4 pages; 4 photos, 8 drawings

The Indian concept of the string instrument bridge differs to the Western because, in addition to a mechanical coupling of strings and resonators, it serves an additional function of modifying timbre, and produces far richer harmonics. A brief history, descriptions and comparisons of the proto-bridge, simple bridges with solid resonators and simple bridges with membrane resonators are provided. Five types of bridge mechanisms are used in the Indian subcontinent. The unique flat bridge is often referred to as the jawari and is found on instruments such as the rudra vina, sitar, sarasvati vina, gotuvadyam, surbahar, and tanpura. Another type is the combination of flat and membrane bridges found in drone strings of the sarangi and sarod. [Additional keywords: banjo, sympathetic vibrations, tamboura, esraj, dilruba, saringda, ektar, dotar, ravinhatu, folk instruments, adjustable bridges]

"The Till Family Rock Band" by Dr. A M Till. 2 pages; 3 photos

The author writes about his research into family members who toured widely in the British Isles and America in the 1880s. His discovery of an aging photograph shows them playing a lithophone or xylophone made of stones laid on a trestle, with wood hammers as mallets. Named a Rock Harmonicon, the instrument used at least 50 stones in two layers, which suggests they were tuned in a modern chromatic scale. Other families made similar instruments. They and the whereabouts of these instruments are listed in the sidebar. Many now reside in museums. [Additional keywords: sounding bars, glockenspiels]

"Air Column Shapes for Winds: Basic Principles, Part 1" by Bart Hopkin. 6 pages; 6 drawings

This article is an explanation of practical wind instrument acoustics. It provides an overview of wind instrument bore shapes, and how different shapes affect sound and playability. The physical properties of airflow and the role of chamber resonance are described. Comparisons of cylindrical to conical bores and their effect on harmonic overtones, the effects of standing wave patterns in air columns, and other considerations are discussed. Formulas and bibliography provide further useful information sources.

NOTE: This and 3 subsequent articles have been reprinted, with substantial updates, corrections, improvements and additions, as the book Air Columns and Toneholes, available from Experimental Musical Instruments.

[Additional keywords: aerophones, flutes, tubes, modes, nodes, toneholes, mouthpieces]

"How To Build the Pianorad: Construction of the Instrument Combining the Piano and Radio" by Clyde J. Fitch. 2 pages; 2 drawings

Originally published in Radio News magazine, this 1926 article explains how to build a truly vintage electronic instrument. Predating analog synthesizers, transistors, integrated circuits, and microprocessors, each of its 25 home-built audio frequency oscillators uses, among other components, a vacuum tube, a condenser, and a transformer winding less its iron core. It instructs builders to use a nail in place of the core, moving it back and forth by hand for oscillator tuning. The disturbing super-heterodyne and beating effects of tunings gone awry are described, suggesting the equivalent sound quality of the ring modulator. Partial schematics included. [Additional keywords: amperes, filaments, rheostats, keyboards]

"Sound by Artists: Book Review" by Bart Hopkin. 1 page.

Review of an anthology of writings, edited by Dan Lander and Micah Lexier, about sound art. It assembles essays by over thirty artists', including an extensive bibliography and discography. Published in 1990 by Art Metropole in Toronto, these texts are informed by Luigi Russolo's Futurist Art of Noises and John Cage's electronic music credo, and are aimed at opening the artistic use of sound to uses that extend beyond music; where listening, recorded sounds as material, the avant-grade, radio and mass media all offer many new ideas and methods for the art of sound.

VOLUME 7 #6, JULY 1992

"Process And Development of the Waterharp" by Richard Waters. 3 pages; 5 photos

Well-known for his invention and marketing of the Waterphone, Waters describes some spin off ideas and varied approaches to his design of acoustic water-oriented instruments, as well as the construction of the waterlyre; history, materials, and dreams.

Four photos detail his waterharps, illustrating the bridges, stainless steel bowls, tree branches, tuning pegs, resonators, and attachment of strings. [Additional keywords: nature sounds]

“Aspects of the Terrain Instruments” by Leif Brush. 5 pages; 14 photos

Brush’s article describes his systems for creating and listening to and sometimes modifying the sounds of hidden natural events. In one of his outdoor installations, galvanized and stainless steel wires strung between trees can be monitored. The large-scale site-specific pieces use special contact sensors or transducers, attached to wood or ribbons, to amplify microsound events. FM radio transmitters are used to carry preamplified vibrations of atmospheric phenomena acting upon man-made sources. In some cases sounds are presented as they are, in others sounds are manipulated electronically. Among the many installations shown here are Insect Recording Studio, Chord Draft Monitor, Meany Ice Floe, Treeharps Network, Terraplane Chorography II, and The Telephone Finally Earns Its Keep. One concept involves solar powered electronics and satellite transponders. [Additional keywords: electroacoustic, nature sounds, soundscapes, interactive arts]

“Air Column Shapes for Wind Instruments: Basic Principles, Part 2” by Bart Hopkin

The second half the article featured in issue #6, this one focuses on acoustic behaviors of air columns and chambers in more practical detail than Part 1. Provided are comparisons of conical and cylindrical tubes; frequency and wavelength calculations; information on effects of air column thickness (cross sectional shape and bends). The properties of bells and mouthpieces are divided into discussions of radiation and reflection at tube openings, the effects of mouthpieces and reeds on resonances, and overall shape. Hemholtz resonators are also discussed. Formulas and bibliography provide further information sources. NOTE: This and 3 subsequent articles have been reprinted, with substantial updates, corrections, improvements and additions, as the book *Air Columns and Toneholes*, available from Experimental Musical Instruments.

[Additional keywords: aerophones, apertures, flutes, modes, antinodes, nodes, oscillations, overtones, partials, toneholes]

“Building a Color Organ: The Harmonicophone Shows Notes and Harmonics Sounded” by Manuel Comulada

Originally published in *Science and Invention*, this 1922 article describes the construction and principles of electrical circuits selectively tuned in response to different frequencies by means of Helmholtz resonators. Not only can this system be used for pure aesthetic results, it also can be a tool for the study of acoustical physics, e.g., a spectrum analyzer. For a full history of color organs see Ken Peacock’s articles in Volume 7, issues #2 and #3. Also mentioned is the patent for an acoustically-controlled submarine torpedo. [Additional keywords: lights, lighting,

oscillations, overtones, partials, science, vanes]

“Rocks in Rut” by Robin Goodfellow 2 pages; 3 drawings
Goodfellow’s report on natural rock whistles focuses on barnacles and clams, found among rocky Pacific coastal waters and beaches. The acorn barnacle or *Balanus glandula*, has a conical shape and high, piercing tone. Another sea creature, *Penitella penita* bores holes into rocks, leaving them suitable as panpipes of relative greater range and prettier tones. The curious biology of *Penitella penita* and *Balanus glandula* are also described. [Additional keywords: oceans, shells, natural materials, tunnels, zoology]

“The Zil” by Liza Carbé 1 page; 1 photo

Carbé’s article describes her invention, a string instrument that has a metal cone resonator shaped like a megaphone. Multiple strings (piano wire) runs across the large end opening, with a wood bridge attached to the lip of the cone. Other strings pass through the cone and are attached to a tuning mechanism mounted along its length. Pitch bending capabilities are available and it is tuned to a pentatonic scale. [Additional keywords: harps, harpsichords]

VOLUME 8 #1, SEPTEMBER 1992

“Mobius Operandi: Instruments by Oliver Di Cicco”: Peter Whitehead. 5 pages; 9 photos.

A description and tour of instrument builder Oliver Di Cicco’s sound sculpture instruments that consist primarily of percussion and stringed instruments made from steel, aluminum and wood and fitted with pick-ups. [Additional keywords: sound sculpture, Mobius Operandi]

“The Ondes Martenot”: Thomas Block. 5 pages; 14 photos, drawings and diagrams.

A concise article describing this early electronic instrument, invented by Maurice Martenot, that consisted of a keyboard along with a pull-cord and finger-ring to adjust frequency. Its history is given in evolutionary stages and its performance techniques are addressed as well. [Additional keywords: theremin, keyboard instruments]

“Improvisation with Experimental Musical Instruments”: Tom Nunn. 3 pages.

A short treatise on one’s personal approach to improvising with experimental musical instruments. Topics addressed are: advantages and disadvantages of improvisation, physical limitations of the instrument and the relationship between the instrument and the player.

“Musical Pillars Commentary”: Matthieu Croset. 1 page; 1 photo.
Brief description of the musical pillars of Tamil Nadu in South

India. [Additional keywords: stone pillars, harmonic overtones, lithophones]

“Scrapyard Percussion”: Bill Sethares and John Bell. 2 pages; 3 photos.

The authors discuss the instruments that they built with materials gleaned from visiting metal scrap yards. Cymbals, scrapers and spring reverb arise from a heating element, corrugated tubing and a coil of BX cable. [Additional keywords: found instruments]

“Introduction to Spectrum Analysis”: David R Courtney. 5 pages; 10 diagrams & tables.

The author describes how spectrum analysis is a tool for looking at timbre and leads the reader through its background, the process of sampling and the use of Fourier transforms. [Additional keywords: sampling, waves, oscilloscope, Fourier transforms]

“Circuit-Bending and Living Instruments”: Qubais Reed Ghazala. 6 pages; 17 photos.

Ghazala lays the foundation for his experimental electronics, which often involves deliberately mis-wiring existing, inexpensive, low-voltage electronic components, toys and gadgetry, in search of interesting sounds. He gives the reader definitions, explanations of general practice and rules, procedures and safety tips for dealing with audio circuit boards. [Additional keywords: experimental electronics]

“Trans-atlantic African Organology: The Tradition of Renewal”: Richard Graham. 7 pages; 7 pictures.

An article dealing with organological change in Africa and diaspora. There is an in-depth focus on two musical instruments, the steel drum and the tamborim. Numerous examples are given throughout and a thorough bibliography is given too.

VOLUME 8 # 2 DECEMBER 1992

Letters and Notes: 3 pages; 3 photos and 1 drawing.

Rene van Peer: Views on Akio Suzuki. John J. Maluda: Discovery of Ron Konzak’s Puget Sound Wind Harp. Wesley Brown: Description of bass flutes at the National Flute Association. Description of labial reeds. Description of the Yamaha Disklavier

“Complex Acoustics in Pre-Columbian Flute Systems”: Susan Rawcliffe. 11 pages; 18 line drawings and diagrams.

The author describes the advanced techniques of construction that were used in manipulating sound in Pre-Columbian clay flutes. She addresses the designs of flute apertures and hoods, body shapes, vessel flutes, tubular flutes and hybrid forms, such as ball and tube flutes, whistles and ocarinas. Timbre and tuning is also touched upon and the article also includes an extensive appendix, notes and bibliography. [Additional keywords: ceramics, ocarinas, whistles]

“Kitchen Drums”: C. Luc Reid. 2 pages; 2 pictures.

An article on the construction of drums made out of plastic food service tubs. Attention is also paid to the formation of the instrument’s frame. [Additional keywords: found objects]

“Circuit-Bending and Living Instruments: The Odor Box”: Qubais Reed Ghazala. 7 pages; 6 photos.

Ghazala gives the background and evolutionary stages of his Odor Box, a machine that opens new possibilities for the basic electronic oscillator. The reader is taken through his first body-contact player interface to its more complex forms; from early concertizing in the sixties to recent gallery showings.

“A Hole is to Hit”: Robin Goodfellow. 4 pages; 6 drawings.

An overview of several world percussion instruments that incorporate skins over a hole, such as an African conical drum and a Mexican and Nepalese drum. [Additional keywords: membranophones]

“The Sound of Crystals”: Bill Sethares and Tom Staley. 2 pages; 1 diagram.

A mathematical approach to mapping the molecular data of ‘noiseless’ crystals into musical patterns by turning diffraction patterns into sound. [Additional keywords: Fourier transforms, auditory crystallography, diffraction]

“DNA Tunings”: Susan Alexjander. 2 pages; 1 picture.

The author describes how she went about mapping molecular light absorption spectra into sound. Her piece entitled, “Sequencia” was based on the ratios of light frequencies in the light absorption spectra of certain DNA molecules. She also talks of programming the synthesizer for the sonic realization, and performance issues.

“Motorized Guitar Objects”: Glenn Engstrand. 4 pages; 9 pictures and photos.

The author investigates electric guitar pickups in interaction with small electric motors held in proximity, in a historical overview and an in- depth look into how these “motorized guitar objects” work. The author’s various projects, such as Godzilla, Flying Glove and TBF Avenger are mentioned. [Additional keywords: electromagnetic pickups]

VOLUME 8 # 3 MARCH 1993

Letters and Notes: 5 pages; 2 drawings and 4 photos.

Alan Tower: Butterfly sounds. Peter Denny: Kitchen drums. Pete Hurney: Guatemalan Marimba. Gordon Frazier and the Sumpter Valley Jew’s Harp Festival. 3rd Annual Chicago Invented Instruments Festival.

“Ken Butler’s Hybrid Instruments”: Ken Butler. 5 pages; 15 photos.

A background and description of Ken Butler’s hybrid instruments

and their playing techniques. The instruments are made up of household objects or other found objects fitted with strings and other sounding devices, usually employing a pickup. His notion of 'hyper utility' is clearly evidenced in instruments such as the Bicycle Seat Violin, Machine Gun Viola and Baseball Bat/Cane/Cello. [Additional keywords: sound sculpture]

"An Experimental Slide Bass Clarinet": Wes Brown. 3 pages; 2 photos and 3 diagrams.

The author describes his Experimental Slide Bass Clarinet, a cylindrical tube with a slide and a bass clarinet mouthpiece. There is a description of its design, how it was constructed and the technical formulas used to achieve it as well as its possible musical range and how to perform on it. [Additional keywords: reed instruments]

"Wind Instrument Toneholes": Bart Hopkin. 7 pages; 7 drawings and diagrams.

Part one of a pair of articles focusing on the placement, sizing and design of toneholes for wind instruments. The author introduces theoretical methods from guesswork to calculation, formulas, rules to base your decisions on and added comments on register holes and globular flutes. NOTE: An updated, augmented and much improved version of the information appearing in this article appears in the book *Air Columns and Toneholes* by Bart Hopkin, also available through this web site. [Additional keywords: flutes; woodwinds]

"Still Nothing Else Like It: The Theremin": Ivor Darreg and Bart Hopkin. 5 pages; 2 pictures.

A history and description of the instrument and its inventor, Leo Theremin. There is also detailed information on how the theremin works as well as approaches to playing the instrument. Important sidebars on oscillators and capacitors and theremin making are also given. [Additional keywords: oscillators, capacitors]

"A Simple Theremin from Schematic to Performance": Bonnie McNair and James Wilson. 2 pages; 2 diagrams.

A concise description on how to build your own very basic theremin and what materials are needed. NOTE: a correction to the schematic appearing in this article will be found in the letters section of the following issue, *EMI* Volume VIII #4, June 1993.

"The Music Atrium: A Musical Playground for Kids": Dean Friedman. 4 pages; 6 photos.

The author discusses his six acoustic and synthesizer-based sound sculpture instruments for kids, with attention paid to design and the harmonic templates available. The instruments are designed for use in exhibits and public spaces. Such instruments as the Bobble, a globe mounted with bicycle horns that play whistles and recorder mouthpieces, the Honkblatt, stools that play fog horns when sat upon, and the Jingle-Lingle-Lily, a bouquet of plastic flowers that trigger a Proteus sound module when touched, are described. [Additional keywords: sound sculpture]

"Circuit-Bending and Living Instruments: The Photon Clarinet": Qubais Reed Ghazala. 4 pages; 4 photos.

An article focusing on the author's Photon Clarinet, consisting of a box photo resistor that houses an audio oscillator that is triggered when a hand is waved. Details on how it operates and its design are given. In an extended introduction to this, the author looks at instruments of magical sounds in voice and playing technique like the Hungarian cimbalom, the Chinese tiger gong and the Renaissance racket. [Additional keywords: theremin, photo resistors]

The Soundscape Newsletter: World Soundscape Project, reviewed by Tom Nunn. 1/2 page.

A report on of the World Soundscape Project and its newsletter. It is an organization devoted to awareness of the sonic environment.

VOLUME 8 #4, JUNE 1993

Letters and Notes. 5 pages; 7 photos.

Phil Krieg: Corrections to the digital theremin schematic that appeared in the previous issue. Mike Hovancsek: Groan tubes [additional keywords: toy, reed, plastic]. Miekel And: Walker Art Museum, Fluxus, sound installations. Peter Hurney & Andy Cox: Mirliton membranes, marimba books. Duane Schultz: Many-belled free-reed horn [additional keywords: schalmei; Martintrompete]. Hal Rammel and devil's fiddles. Haags Gemeentemuseum, technical drawings & plans for musical instruments. Dreamweaver hand-carved electric guitars. Volker Hamann and the Brusselhorn. Vestel Press.

"Stardust" by Reinhold Marxhausen. 6 1/2 pages; 9 photos; 1 drawing.

Reinhold Marxhausen makes beautiful metallic sculptural sound instruments, most of them small enough to be hand-held. In the article he describes his lifelong romance with sound, much of it through the eyes of child, set in blank verse. [Additional keywords: stones; rocks; welding; styrofoam; prongs; lamella]

"Hal Rammel's Sound Palette" by Mike Hovanksek. 1 page; 2 photos; 2 drawings.

A description of the Sound Palette, an instrument consisting of a set of wooden rods mounted on what had been a painter's palette, played by bowing or plucking. It's amplified with a contact mic and the sound may be enhanced with electronic effects.

"Computer Analysis of Clarinet Multiphonics" by Kenneth J. Peacock. 4 pages; 6 charts; 1 drawing.

The author presents and analyzes computer-generated spectrographic displays representing FFTs (Fast Fourier Transforms) of clarinet tones using special fingerings to achieve multiphonics. [Additional keywords: spectrum analysis]

"Incantors" by Qubais Reed Ghazala. 3+ pages; 2 photos.

After a brief preliminary discussion of historical attempts at speech synthesis, Reed Ghazala goes on to describe his Incantor. The Incantor is an aleatoric electronic instrument made by deliberately mis-wiring and short-circuiting the electronic toy called Speak & Spell. [Additional keywords: Paget, formants. VODER]

"Wind Instrument Toneholes Part 2" by Bart Hopkin. 4+ pages; 5 drawings.

Following the more theoretical text in Part 1 of this article (see EMI's previous issue), this second part emphasizes practical aspects of tonehole making and tuning, as well as home-buildable tonehole key levers and pads. Note: a much improved and updated version of this article and the others of this series is available in the booklet *Air Columns and Toneholes*, available through EMI. [Additional keywords: Side holes, Leonardo da Vinci]

"Don't Sue Me, I Just Want Your Sounds," by David Barnes. 3 pages; 4 photos.

The author describes his compositional and instrument-making work based on other people's instruments that he has seen described in earlier issues of EMI. He discusses his instrument based on Tom Nunn's T-Rodimba, his Trash Can Platter based on instruments from Peter Whitehead, a bass tubulon (steel conduit marimba), and his PVC Monster based on Phil Dadson's end-slapped plosive aerophone tubes. [Additional key words: slap tubes, metallophones, metal rods]

"Systems for Non-Linear Instruments and Notation, Part 1" by Dan Senn. 5+ pages; 6 photos; 3 diagrams.

Instruments which can't be prescriptively controlled by the maker or player, but which follow their own unpredictable patterns of sound, can be called, in author Dan Senn's word, 'non-linear.' This article talks about several such instruments made by Dan Senn as well as other makers, and the devising of notation systems for them. Among the makers and instruments discussed in Part 1 of the article: Phill Niblock, Volker Staub, Stuart Saunders Smith, Joel Chadabe, David Zicarelli, Johannes Schmidt-Sistermanns, and Joe Jones. See Part Two of this article, in the following issue (EMI Vol. 9 #1) for more on the author's own instruments. [Additional key words: scrapercussion; improvisation; computers; sampling; photovoltaics; sound sculpture]

Book Reviews. 1 1/2+ pages.

Douglas Kahn & Gregory Whitehead, editors: *Wireless Imagination: Sound, Radio and the Avant-Garde*. [Additional keywords: sound art]

C.A. Fortuna: *Microtone Guide* [Additional keywords: just intonation; equal temperaments; tuning theory]

Letters and Notes: 6 pages; 5 drawings and 2 photos.

Hugh Davies: Theremin. Warren Burt: Theremin. Blake Mitchell: Bass Tubulon. Baschet's Flutter Moths. Circus World Museum in Wisconsin. Darrell De Vore's comments on kid's toy, 'groan tubes,' Jew's Harps

"Tumbas, Rumba Boxes, and Bamboo Flutes: Caribbean Instruments by Rupert Lewis": Bart Hopkin. 3 pages; 5 photos. The first in the series of articles focusing on Jamaican instruments. This article describes the instrument maker, Rupert Lewis and his instruments, which consist of tumbas, a drum similar to the conga, rumba boxes, a large lamellaphone related to the African mbira and sideblown diatonic flutes. [Additional keywords: congas, lamellaphones, thumb pianos, marimbas]

"The Giant Lamellaphones: A Global Perspective": Richard Graham. 3 pages; 1 photos and 1 drawing.

This article traces the history and origins of giant lamellaphones — bass kalimbas also known as rumba boxes or marimbas — focusing on the development of the instruments in African and the African diaspora. [Additional keywords: mbiras, thumb pianos, rumba boxes, marimbas]

"Music By Mailorder": Mike Hovancsek. 3 pages.

A list of mail order companies specializing in unusual musical instruments. Makers and companies, ranging from the experimental instruments of Q.R. Ghazala and Richard Waters to the medieval, folk and world instruments of Kelischek Workshop, Hughes Dulcimer Co. and Lark in the Morning, to 'hard-to-find' animal materials of the Boone Trading Company are mentioned.

"Of Bowhammers and Palmharps, Conundrums and Kabalis: Mike Masley's Urboriginal Innovations": L. Maxwell Taylor. 3 pages; 4 photos.

An article on Michael Masley and his modified world instruments. His work includes the invention of unique bowhammers (special string-sounding devices that contrast greatly with the usual wooden hammers associated with the Hungarian cimbalom), the Palmharp (an idiophone strung with rubber bands and metallic strings), the Kabali (a modified dumbek) and glass panpipes. [Additional keywords: hammer dulcimers, dumbeks, panpipes]

"The Sound Hunter" Roman Pawlowski. 3 pages; 3 photos and 2 drawings.

The author focuses on the instruments of Martien Groeneveld of Amsterdam and the influences that the sea, city and street have on the maker as well as how his instruments parody conventional ones. Groeneveld's instruments include the Giant Xylophone, the Sea Machine, the Roof-tile-o-phone, and the Volkswagen-beetle-harp.

"Circuit-Bending and Living Instruments: Vox Insecta": Qubais Reed Ghazala. 3 pages; 3 photos.

This article focuses on an insect-voice synthesizer called the Vox

Insecta that was built to replicate insect sounds. Also included are details on how it operates and its design as well as how to construct one yourself and a classification of insect sounds.

“Systems for Non-Linear Instruments and Notation” Part Two: Dan Senn. 5 pages; 4 photos, 1 score, 2 tables and 1 diagram. In part 1 of this article, appearing in the previous issue, author Dan Senn described some ideas that have been important to him in sound sculpture work, and showed how these ideas manifest themselves in his own work and that of several other selected sound sculptors. Here in part 2, the composer and instrument builder gives the background to the creation of his piece, *Scrapercussion #8*, by explaining how finding the materials of instrumentation for the piece helped formulate his non-linear score. Also included is a description of the design and workings of some of his sound sculpture, such as the Four Harpoons, instruments that incorporate found objects, nylon thread and PVC piping, and Ten Too Lips, made of threaded rods and metal washers which ride downward as they spin loosely down along the threads of the rods. [Additional keywords: sound sculpture, found objects, fayfer harp, schmoos harp, flutter harp]

“Instruments from the Marx Colony”: Bart Hopkin. 5 pages; 15 photos and pictures.

This article features the Marx Music Company, an instrument-making company from the early part of the 20th century. The company's history and a description of their instruments and designs are featured. Some of the instruments described are the Marxophone, an autoharp instrument that incorporates the use of hammers, the Violin-uke, a wire zither that is strummed as well as bowed, and the Aqua-Lin, a small zither that incorporates simultaneous bowing and hammering. [Additional keywords: Piknik, simplified violin, Elderly Instruments]

Book Reviews. 3 pages

Margaret Kartomi: *On Concepts and Classifications of Musical Instruments*.

Rene van Peer: *Interviews with Sound Artists Taking Part in the festival ECHO*.

Jan Rose and Rainer Linz: *The Pink Violin: A Portrait of an Australian Musical Dynasty*

VOLUME 9 # 2 DECEMBER 1993

Letters and Notes: 3 pages; 3 photos and 1 diagram.

Gino Robair: brick xylophone. Ivor Darreg 's recent letters. Andy Cox 's Lamellaphones.

“The 13 Tone Ensemble” and “Just Intonation Cardboard Bongos”: Buzz Kimball. 1 page; 2 photos.

A brief description of a 13 tone tubulon (steel conduit marimba) and justly tuned cardboard-tubing drums. [Additional keywords: alternative tunings, microtonality, found objects, tubulongs, tubalongs]

“Sugar Belly’ Walker and the Bamboo Saxophone”: Bart Hopkin. 3 pages; 3 photos and 3 drawings.

The second in the series of articles focusing on Jamaican instruments. This article gives a history and description of the instrument maker and performer Sugar Belly, and his Bamboo Saxophone. Also featured is a commentary by a Hawaiian bamboo saxophone maker, Brian Whittman, and his creation of the Xaphoon.

“Deagan Organ Chimes”: Bart Hopkin. 7 pages; 10 photos and 4 drawings.

An article on the giant metal chimes constructed by J.C. Deagan and Company. The instruments, that bare a striking resemblance to the Indonesian bamboo anklung, are described physically. Their history, starting with their origins in the early 20th century, is discussed. An account of the surviving instruments and an important appendix on air resonance tuning for the chimes is also featured.

“Extended Wind Instruments from Warren Burt and Brigid Burke”: Warren Burt. 2 pages; 7 photos.

The author relates his experiments with extended wind instruments, using plastic tubing and other components attached to various wind instruments like the clarinet, flute and tin whistle. The instruments result in different microtonal scales, multiphonics and harmonics that also require new playing techniques. [Additional keywords: microtonality, extended techniques]

“Circuit-Bending and Living Instruments: The Sound Dungeon”: Qubais Reed Ghazala. 4 pages; 3 photos and 1 diagram.

This article focuses on electro-acoustic spring chambers, most notably on the author's Sound Dungeon, which is a kind of spring reverb chamber. Also included are details on how it operates and its design as well as how to construct one yourself.

“Relating Timbre and Tuning”: Bill Sethares. 8 pages; 19 diagrams and tables.

A technical article on finding scales for nonharmonic timbres and timbres for equal tempered scales. Reference is made to acousticians such as Helmholtz, as well as Plomp and Levelt, and their explanations of consonance. The author gives details on calculating dissonance curves and finding their properties and constructing scales appropriate to timbre. Details for a Microsoft BASIC program are also included for calculating dissonance curves. The ideas discussed in this article were later developed in full in the author's groundbreaking book, *Tuning, Timbre, Spectrum, Scale*, available through the EMI Amazon-affiliate bookstore on this web site. [Additional keywords: microtonality, dissonance curves, timbre]

“Spherical Epoxy Resonators”: Drew Pear. 2 Pages; 1 drawing.

The author explains the construction of spherical resonators made with balloons and epoxy. His materials and equations to determine the proper diameter of the resonators are shown as well as a detailed section on the process of application of epoxy

to the balloons. [Additional keywords: marimbas]

“A Bamboo Organ” and “Electric Una-Fon Makes Music to Beat the Band”: articles reprinted from ‘The Etude’ and ‘The Electrical Experimenter’. 1 page; 2 pictures.

Two short articles on unusual instruments from early periodicals. The first is about a bamboo organ in the Philippines and the second about an early electric keyboard instrument similar in sound to a pipe organ.

“A 34-Equal Guitar”: Larry A. Hanson. 1 page; 1 photo.

A short explanation of Hanson’s guitar which has been refretted to produce the 34-tone equal temperament scale. The author suggests that this scale offers a good approximation of just intonation tunings. He explains that the tuning shines in regards to the use of major/ minor thirds and modulation to different keys. He details his tuning of the strings and the naming of new tones. [Additional keywords: microtonality, equal temperament, frets, refretting]

Book Reviews. 1 + pages

Will Ditrich: *The Mills College Gamelan: Si Darius and Si Madeleine*

Anthony Baines: *The Oxford Companion to Musical Instruments*

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Letters and Notes: 5 pages; 7 photos.

Mike Hovancsek: P.W. Schreck’s ‘piano harp’. Richard Selman: Caribbean Marimbula. Don Loweree: Tunnel Resonance. Hugh Davies: Theremin and Bamboo Organ. Arthur K. Ferris’ String Instruments. Ken Butler’s Headboard Grand Piano. Jean-Claude Chapuis’ Glass Instruments. Alex Jordan’s House on the Rock.

“Elemental Mallet Instruments”: Jim Doble. 3 pages; 6 photos and 1 drawing.

The author relates the history of his instruments and how he went about building them and addressing issues such as tuning. A description of the percussion instruments follows focusing on instruments such as the Rockadinda (an instrument consisting of pieces of stone or old roofing slate on maple burl) and the Monkey Gong (a propane tank hit on the tongues to produce two tones). The author also gives details on wood xylophone construction. [Additional keywords: marimba]

“The Bamboolin: A Jamaican Idiochord Zither”: Bart Hopkin. 4 pages; 1 photo and 2 drawings.

The third in a series on Jamaican musical instruments. The bamboolin is a bowed idiochord in which a thin strip is lifted with two bridges from its bamboo body to produce the ‘strings’ to bow. Discussed is a history of the creator, Jonathan Brown, the instrument’s materials and bridges, and a survey of related instruments, such as the Malaysian keranting, African mvet and the Malagasy valiha. Also included is information on making idio-

chords (instruments whose strings are of a piece with the body of the instrument, rather than being of separate material): lifting the fibers, determining the width and thickness of the string, and techniques for sounding.

“The Benta: An African-Derived Glissed Idiochord Zither of Eastern Jamaica”: Richard Graham. 3 pages; 2 photos and 2 drawings.

This article is about the benta, a traditional glissed idiochord zither of bamboo (similar to the bamboolin described above, but much larger and with a very different playing technique), and the methods to construct and play one. The author also focuses on the instrument in its social and cultural context, and provides a thorough bibliography.

“Report from the Cloud Eight Archive of Musical Instruments and Fortean Musicology”: Davey Williams. 3 pages; 6 drawings.

A sampling of some of the obscure sound devices (actually non-existent, fanciful, surrealistic and humorous) found in cataloging the archive of Cloud Eight. Some of those mentioned are the Sonic Painting Device, the Musical Hunter’s Animal Startling Device and the Drink-Mixing Hydraulic Harmonicum.

“Two Hardware Store Instruments”: Barry Hall. 2 pages; 3 photos; 1 diagram.

The author relates how to build two simple idiophones from common items. In the Flower Pot-O-Phone, flowerpots are mounted on a three-tier frame providing stability and easy access. In the Washer Chimes, several washers with small holes drilled in them are hung from wooden bar giving off a sound similar to Tibetan tingsha cymbals. [Additional keywords: flowerpots, homemade instruments, idiophones]

“Environment and Process”: Marlin Halverson. 5 pages; 10 photos; 1 drawing.

This article focuses on the work of artist Mineko Grimmer and her sound sculpture installations. A description of the visual and sonic aspects of her ice sculptures with bamboo, pebbles and wood are given alongside a history of performances and showings as well as comments on how the work engages and interacts with the gallery environment.

“Circuit-Bending and Living Instruments: Inverters”: Qubais Reed Ghazala. 3 pages; 4 photos.

Ghazala discusses two versions of his Inverters, digital sample boxes that are appropriate for off-trail music making. A detailed description of the existing instruments is given as well as information on how the instruments work. [Additional keywords: digital sampling]

“Novelty Instruments from the Early Days at Mussehl & Westphal”: Bart Hopkin. 5 pages; 8 photos and 8 drawings.

An article on Mussehl & Westphal, a musical saw company of the 1920s. The company’s history is given, with descriptions of some of its other offbeat inventions, such as the Musical Pitchfork, a one stringed instrument played with a pick or bow,

and the Jazz-O-Nette, a slide whistle. [Additional keywords: novelty instruments]

VOLUME 9 # 4 JUNE 1994

Letters: 5 pages; 7 photos and 3 drawings.

Mineko Grimmer: Aeolian Harp story. Michael Meadows: Conventional instruments. Pete Hurney: Anklung related. Robin Gill: Dan bau. Ken Lovelett: Nagarra drums. Matthew Reynolds: Sound chambers. Art Finigan: Mando-Zither-Harp. Ivor Darreg in Memoriam: Jonathan Glasier, John Chalmers, Garry Morrison and B. McLaren pay respects.

“Bamboo Brass in the Minahassa”: Robert Boonzajer Floes. 6 pages; 7 photos and 3 drawings.

This article relates how Dutch missionaries in Minahassa, a part of Sulawesi in Indonesia, simultaneously caused a collapse of indigenous music and gave rise to the appearance of imitation brass instruments built in bamboo among the islanders. There is a focus on various ensembles and instruments, such as the Korno, Bambu Melulu, Bambu Seng and simple diatonic instruments. Pitch is discussed as well as how the instruments are played and what music is performed and its relation to village life.

“Bill Colvig”: Sasha Bogdanowitsch. 4 pages; 11 photos and 1 drawing.

Instrument builder Bill Colvig is famous for igniting the American Gamelan movement along with composer Lou Harrison. The author gives the reader Colvig’s history and descriptions of many of his instruments, such as the Monochord, Standing Harp, Psaltery, a plucked zither and Suling: PVC constructions modeled after the Indonesian reed flutes.

“Software-O-Phones: Homemade Software Instruments”: Henry Lowengard. 3 pages; 4 pictures.

An article featuring the creation of experimental software instruments by using the Commodore Amiga. The author describes several programs: 1) RGS: A program that paints sonograms by use of spectral analysis, 2) HARM: a program that creates sound effects digitally and 3) LYR: a MIDI controller that acts like an autoharp. [Additional keywords: computer instruments]

“The Bellatope”: Ken Lovelett. 1 page; 1 photo.

The author explains how he accumulated and assembled his Bellatope, a conglomeration of percussion instruments arrayed in the shape of an amphitheater. He discusses the playing of the assemblage, and what it enables him to do. [Additional keywords: drums, cymbals, bells, Protocussion]

“Mechanical Instruments: History of an Obsession”: Penelope Mathiesen. 7 pages; 7 pictures.

A history of mechanical music, first focusing on definitions of terms, then on particular instruments like the barrel organ (a

mechanized pumped organ), various sorts of automata (figures that play music on actual instruments), orchestrions (a mechanical devices that play multiple instruments), as well as musical boxes and player pianos.

“Circuit-Bending and Living Instruments: The Video Octavox”: Qubais Reed Ghazala. 5 pages; 3 photos and 1 picture.

An article focusing on musical automata with a major example in Tippoo’s Tiger, an east Indian sound-making artifact in the shape of a tiger eating a man. Ghazala gives reference to other known automatic musical instruments, and then focuses on one of his own, the Video Octavox, which uses video tapes to trigger photocells which activate eight oscillators.

“Notes on Custom Pickup Winding and the Quest for Resonance”: Steve Ball. 3 pages; 6 photos.

An article on electromagnetic pickups and the process of building custom ones. The focus is on the author’s instruments, the Industrial-Strength Dulcimer and Elation Instiller, which are stringed instruments with pickups. In the follow-up article to this one, appearing in the next issue (EMI Volume 10 #1, Sept. 1994), the author gives detailed how-to for constructing your own electromagnetic pickup.

“A Piano for Invalids” and “Dream of a Salesman”. Reprinted from *The Etude* magazine, probably early 20th century.

Reprints of two very brief articles taken from a now-defunct music magazine. One describes a piano keyboard somehow positioned over a bed for convenient playing while reclining; the other describes a multiple violin bow which, in conjunction with a modified bridge on the violin, allows the player to sound all four strings at once.

Book Reviews. 1/2 page

Christine Armengaud: *La Musique Verte: Appeaux, Sifflets, Crecelles*

VOLUME 10 #1, SEPTEMBER 1994

Letters and Notes. 3 pages; 1 drawing.

C. Reider: Electronic signals made by the brain, compact disc as instrument [additional keywords: cochlear implant; destroyed compact discs]. Jeff Kassel: mouth music [additional keywords: membranophones/aerophones; idiophones]. Francois Baschet: technical drawing and directions for simple water whistles.

Mitchell Clark on Tippoo’s Tiger by Mildred Archer. Information on Memorial Fund and Collected writings by microtonal theorist Ivor Darreg. *Musica Getuscht* by Sebastian Virdung in 1511 covers early work on instruments in Europe. Theremins still available through Bob Moog. Radio show on unusual sound: One Tone, Two Tones, Overtones on Canadian Broadcasting System. Bill & Mary Buchen with book: *Urban Sound Park Design* and video: *Sounds (Like India)* [additional keywords: Sonic Architecture;

automatic temple bells; prayer wheels; cows]. Leon Gruenbaum & The Samchillean Tip Tip Tip Cheeepeeeee keyboard.

“Fire Music”: Introduction Bart Hopkin. 1 page; 1 drawing. A brief description of how to build a fire organ using flame (propane torch) and glass tube(s) and why it creates sound; scientific help from Donald Hall; brief bibliography. This article, with additional materials, can be viewed on EMI’s web site (<http://www.windworld.com/emi>). [additional keywords: pyrophones].

“Michel Moglia’s Fire Organ”: Etiye Dimma Poulsen. 1 page; 2 photos. A brief description of the Fire Organ, an instrument consisting of 250-300 open-ended stainless steel tubes played by placing a propane torch in one end; contrasts Moglia’s Fire Organ with other pyrophones. This and the following articles, with other additional materials, can be viewed on EMI’s web site (<http://www.windworld.com/emi>). [additional keywords: aleatoric effects; untempered octaves; thermal chants].

“Michel Moglia’s Thermal Chants: The Infinite Vibration of The Flame, of Time and Life...”: Michel Moglia (Translation Etiye Dimma Poulsen). 1/2 page. In connection with the previous article, a brief description of Moglia’s philosophy behind Thermal Chants and his wish to stretch outside our cultural system [additional keyword: Chance; Randomness].

“Trimpin”: Trimpin. 1/2 page. Trimpin gives a short account of his attempts to use flames with his Charged Piano and Fire Organ (a pyrophone, not to be confused with that of M.Moglia). [additional keywords: electromagnetic; aural/visual effects of flames].

“Playing With Pyrophones”: Norman Andersen. 3 pages; 6 photos; 1 drawing. Andersen outlines his experiments building pyrophones, including his own Siren, with many kitchen and gas appliances [additional keywords: glass harmonicas].

“More on The Deagan Chimes and My Father’s Stone Chimes, Too” by Ellen Schultze. 2 1/2 pages; 3 photos; 1 drawing. In a follow-up to article on the Deagan Organ Chimes article in December 1993 issue, Ellen chronicles her experiences as a child hearing Reverend Alley’s Triple Octave Shaker Chimes and her subsequent 48-year search for them and for Deagan Organ Chimes. Also included: and a description of her father’s (James F. Cooper) Singing Stones, which are used to perform traditional Christian songs [additional keywords: vibraphones; marimbas; lithophones, American Bell Association].

“Aeolian Harps” by Sasha Bogdanowitsch. 2 1/2 pages; 3 photos; 2 drawings. In this 1st part of a series, this article serves as a preface to the articles that follow by John Oughton and Ros Bandt, and others.

Bogdanowitsch gives the primarily Western historical account of Aeolian Harps. Cited by Homer in 800 B.C. as deriving from the sound of wind blowing on dried animal entrails and later popular in Germany in the 1800s. Wind sounds the harmonics of the fundamental notes that the strings are tuned to. Also a brief description of Bogdanowitsch’s own version, the Ski Harp [additional keywords: wind zither].

“The Story of Aeolian Harps”: John Oughton. 2 pages; 1 photo; 2 diagrams. After a short outline of which harmonics will sound and which fundamentals will not, Oughton gives an account of materials, assembly instructions, and advice on how to place aeolian harps for optimum sound/volume [additional keywords: aliquot parts; wind harp].

“The Aeolian Harps: Ancient Roots” by Ros Bandt. 1 1/2 pages; 2 photos; 1 diagram.

Bandt describes her goals and the making of a wind harp — actually comprised of six subsidiary harps — at Redcliffs in Victoria, Austria [additional keywords; wind harp; zither; pentatonic, double-unison strings].

“The McLean Mix Muses upon the Ultimate Musical Instrument” by Priscilla & Barton McLean. 4 pages; 5 photos. The McLeans describe their evolution as composers, beginning with analog synthesizers, incorporating nature sounds, and finally bridging the two with their own invented instruments (i.e. The Amplified & Processed Bicycle Wheel; The Clariflute; Glacial Rocks; and The Sparkling Light Console) which they describe in some detail [additional keywords: Synthi 100 Synthesizer; whale music; Gagaku ensemble].

“Electro Magnetic Pickup Design and Construction Techniques” by Steve Ball. 4 1/2 pages; 8 photos; 4 diagrams. In conjunction with a previous article (EMI Vol. 9#4, June 1994) summarizing Ball’s experiences designing and building electromagnetic pickups for stringed instruments, this article outlines in great detail the construction of a dual-coil, or “humbucking” pickup [additional keywords: guitar pickups].

“The Qing Lithophones of China” by Mitchell Clark. 7 pages; 5 photos; 3 drawings. A thorough historical account and description beginning with the Shang and Zhou periods through to the Qing Dynasty and finally to present attempts to preserve the tradition of these stone instruments. Mentions shapes, materials, ritual usage, references in texts, extensive footnotes and bibliography [additional keywords: goong lu; chalcophonos; bayin; zhong bells].

“Activities To Date at ASFi Music Works” by Colin Hinz. 5 pages; 9 photos. Hinz names and describes some compositional techniques and his own (anti)musical devices, some (i.e. The Rotary Club; Turntable One) incorporating Meccanion parts (the European and

Canadian name for what in the U.S. is called Erector Set). Among his inventions are The Scrampler, an altered Casio SK-1, The Piandemonium, which utilizes hand-built electronics to strike a sequence of 4096 notes of equal duration on a "harp" made of the insides of a piano, and a Christian Marclay-inspired experiment, cutting and reassembling pieces of vinyl to make tortured, but playable (barely) records. [additional keywords: Mecanno set; electrocageism; cyberserialism; AudioSteriser].

"A Short Introduction To The Bambuso Sonoro": Hans van Koolwijk (Translated by John Lydon). 1 1/2 pages; 2 photos. The Bambuso Sonoro is an instrument comprised of more than one hundred flutes, some of them very long, controlled by variable wind pressure generated by a ventilator that feeds various chambers. With an incredibly broad harmonic spectrum, capable of producing single, thin tones and an enormous mass of sound, it also causes chance subsidiary sounds, rhythmic patterns, and glissandos [additional keywords: bamboo, bird flutes; glissando flutes].

VOLUME 10 #2, DECEMBER 1994

Letters and Notes. 4 pages. 6 photos.

Pete Hurney: Wooden Congas. F. Baschet: Historical Notes on Chemical Harmonica [additional keywords: Flame Organ; Harmonica Thermique/Chimique]. Steve Ball: Stress-relieving metal strap instrument. Marion B. Cox & Ellen Schultze meet for a Deagan Organ Chime Duet. William Steinmayer and The FlamePhone, The Electroman Flame Speaker; booklet available on The Flame Speaker. 64 tuned bronze bells, stone chimes (qing), zithers, and drums discovered with Marquis Yi's tomb (5th Century Chinese Ruler). Grant Strombeck with photos and brief explanations of 3 invented instruments [additional keywords: Flexy protuberance; The Orb]. Jonathan Purcell and Wave Access' Wave Rider: a system for translating brainwaves and electrical impulses into music. Ros Bandt's booklet, Creative Approaches to Interactive Technology in Sound Art available on Deakin Press.

"Aeolian Harps: One Person's Experience": Tom Pearce. 2 pages; 5 photos; 1 drawing. Pearce theorizes on the multiplicity of goals and variables inherent in building an aeolian harp and suggests variables with which he has had the most success. Suggests number and kind of strings, shape of sound box, type of wood, vanes, and location.

"Some Techniques For Amplifying Wind Harps": Richard Lerman. 4 pages; 8 diagrams/ technical drawings. An investigation into the amplification of micro-sounds of the natural world with a piezo electric disks led to exploring wind harp potentials. Site-specific wind harps in Newfoundland, Japan, Peru, and California. With rather thorough directions on how to use piezo disks for wind harps and natural elements.

"Nature Sounds Recording and Use": Catherine Girardeau. 1 1/2 pages.

Second in a series on nature sounds, Girardeau seeks meaning in the rising popularity of natural sound at California Library of Natural Sounds (CLNS), linking it to sense of place, ecological concerns, psychoacoustics, and John Cage's theories of accidental conjunction and found composition. Emphasis placed on Bernard Krause's "Niche Hypothesis," which concentrates not on individual sounds but rather an environmental orchestra, as among other things, an acoustical message about the habitat's biological health. Includes Resource list [additional keywords: bioacoustics; Douglas Quin, Paul Matzner].

"For Paul Panhuysen: On His 60th Birthday, August 21, 1994": Douglas Quin. 1 1/2 pages.

After a brief description of environment and discussion of ecological concerns resembling a journal entry, Quin recounts a trek for ambient nature sound in Amazonas, Brazil. The destination being a NASA observatory now in control by INPA National Institute For Amazon Research [additional keywords: ambient recordings; Minimum Critical Size of Ecosystems Project; World Wildlife Fund].

"Natural Wind Chimes": Steve Heitzeg. 2 pages; 5 photos; 1 drawing.

An essay in which Heitzeg rejects the duality and consequent division of self and nature and emphasizes the inter-connectedness of the two. His wind chimes made of natural materials are featured.

"The Morphium and Strange Earth Voices": Qubais Reed Ghazala. 5 1/2 pages; 2 photos; 5 engravings.

After a brief preliminary discussion of mysterious Earth noises, Ghazala describes his Morphium. The Morphium is an aleatoric electric instrument made by circuit-bending a children's toy with animal and railroad track sounds [additional keywords: mistpouffers; Barisal Guns; Moodus noises; meteor sounds; sample banks; conductive flesh contacts; potentiometers, variable resistors].

"Metallophone Construction": Bill Colvig. 2 pages; 1 photos; 2 diagrams.

A companion piece to both an article on Colvig's instruments in June 1994 issue and a short history of metallophones that follows. Here, Colvig gives a very brief history of tubular metallophones, before giving instructions for a simple metallophone using electrical steel tubing. He briefly discusses various scales with accompanying measurements [additional keywords: fang-hsiang; diatonic scales; tetrachord tone patterns].

"Tubulonia": Bart Hopkin. 4 1/2 pages; 2 drawings; 1 diagrams. After a brief history of metal tubular chimes, mostly focusing on intonational explorations of the 1970s and the variations built by Lou Harrison and Bill Colvig, Erv Wilson, and others, the article focuses on general considerations in design and construction,

including: choosing tubing material, tubing dimensions and proportions, tuning methods, ways of increasing volume, and mounting techniques [additional keywords: tubaphones; J.C. Deagan; microtonalists; tubulongs; oscilloscopes; 13th Harmonic/Indonesian Pelog Scale].

Book Reviews. 1 1/2 pages.

David Doty: *The Just Intonation Primer* [additional keywords: tuning theory].

Ralph David Hill: *Sounds of Just Intonation: Introduction to Nontraditional Harmony* [additional keywords: aural effects].

"The Experimental Sound Studio Invented Instruments Ensemble": Hal Rammel. 3 pages; 5 photos.

A brief description of Chicago's Experimental Sound Studio. Started in workshops in 1990, the emphasis is on designing, building, and playing unique acoustic sound sources using recycled and found materials. Includes brief descriptions of instruments used for a performance in 1993 [additional keywords: graphic notation].

VOLUME 10 #3, MARCH 1995

Letters and Notes. 3 pages; 1 photo; 1 diagram.

Ellen Schultze: The list of Deagan Organ Chimes keeps growing. Classic book of homemade instruments, Sound Designs, available again. Mandala percussion: new mail order catalog of unusual or hard to find instruments. String master software available, used for string scaling. Ernst Zacharias' Tunable Jaw Harp. Ken Wisecup's One String Bass and The Cedar Shop.

"The Alfalfa Viola": Hal Rammel. 1 page; 1 diagram.

A short description of George C. Haium's rustic Alfalfa Viola: a single-string three-tined pitchfork with lard can and cigar box resonators, built in the 1920s.

"The Apache Violin: An Ancient Instrument Moves Into a New Century": Chesley Goseyun Wilson, Ruth Longcor-Harnisch Wilson, & Bryan Burton. 4 pages; 4 photos; 2 diagrams.

An account of the origins of the Tsii'edo'a'tl, or Apache Violin, a cylindrical section of agave plant with one string said to sound like a cross between a flute and dulcimer. With simple building instructions and description of dimensions and characteristics, its use in ceremonial songs and healing rituals from one of the finest builders, Chesley Goseyun Wilson [additional keywords: chengni; ki'zh ki'zh di hi; pitch bending].

"More Tubulonia: Conduit": Stephan Golovnin. 1 3/4 pages; 6 drawings.

Following the more basic article in EMI December 1994 on Tubulongs, Golovnin gives instructions and advice on his conduit Marimbas including his "Kreteg Layang."

"Fork Chimes and Everly Chimes": Bart Hopkin. 2 1/4 pages; 4

drawings.

A description and basic instructions for Everly Chimes, a single metal tube with two fundamental tones and a desired 'beating' affect; and Fork Chimes: a single chime that produces a rainbow of tones [additional keywords: directional rigidity differential; tubulongs].

"Tube Instruments": Daniel Schmidt. 1 1/2 pages; 1 drawing. Schmidt makes some suggestions to control 'beating', his use of 6061 alloy aluminum, and discusses unpredictable overtones [additional keywords: EMT/electrical conduit].

"The Wind Enters The Strings: Poetry and Poetics of Aeolian Qin": Mitchell Clark. 3 1/2 pages; 1 photo; 4 drawings. An essay, citing poems from as far back as 223 AD, on the Chinese qin zither, and the Chinese poetic tradition of qin-qi-shi-shu-hua, in which he has found several references to the instrument being sounded by the wind alone. With notes, including sources [additional keywords: fengzheng; zithers; quqin; shang; feng ru; hui].

"The Flame Componium and Reflections on the Pyrophone": Qubais Reed Ghazala. 6 1/2 pages; 9 drawings/engravings. After a brief discussion of various sound-sensitive pyrophones built around the turn of the century, Reed Ghazala goes on to propose his imaginary Flame Componium and Pyrotechnic Color Organ, both devices that would react visually to sound occurring around them [additional keywords: manometric flames; chemical harmonicas; sensitive flames; musical flames].

"The Banjo King": Frank Holmfield. 3 pages; 9 drawings/graphic reproductions.

Part of EMI's ongoing series of reprinted early magazine articles, this article published in 1901 tells the tale of a South African, Mr. Franco Piper, heralded as the King of Banjoists for his ability to juggle four banjos and play them simultaneously so as to create an affect not unlike church bells.

"Bamboo: The Giant Musical Grass": Richard Waters. 3 pages; 2 graphics.

In this 1st of 3 articles on Bamboo, Waters lists species and characteristics of bamboo utilized in instrument design as well as giving some advice on growing bamboo [bambusas; American Bamboo Society].

"The Sound Merchant": John Herron. 1/2 page; 2 photos. Instructions and description of the Singing Pot Lid Tree, an instrument consisting of a set of aluminum pot lids mounted on an aluminum tube played by bowing with a violin or bass bow. It can be amplified with a microphone and the sound may be enhanced with electronic effects [glass harmonica].

"Sound Symposium 7: Field Report": Tom Nunn. 1 1/2 pages. Tom Nunn describes his experience at the 7th Sound Symposium at St. John's, Newfoundland [additional keywords: music festivals].

VOLUME 10 #4, JUNE 1995

Letters and Notes. 3 pages; 1 photo; 13 drawings.

Richard Waters: Comments on unidentified Earth sounds. The blending of clear pitch and unpitched noise [additional keywords: noise]. Deagan Triple Toned Golden Chimes and Mr. P. Waldo Davis. Helmholtz resonator; amphora. Ivor Darreg's Detwelvuvate. Making Simple Musical Instruments by Bart Hopkin available through Lark Books.

"Nature on Record": Rene van Peer. 3 pages.

Part 1 in a series, this essay focuses primarily on recordings of bird sounds as well as making mention of recordings of frogs and insects. Includes discography.

"Augustus Stroh and the Famous Stroh Violin or The Inventors of Abnormalities in the Field of Violin-Building Have Not Yet Become Extinct": Cary Clements. 7 1/2 pages; 10 photos; 5 drawings.

A thorough historical account of the inventions of Augustus Stroh, focusing on his most famous instrument, a violin with an aluminum diaphragm and large trumpet horn to amplify it. Gives a brief description of early recording techniques at the turn of the century as well as his ventures with phono- and telegraphs [additional keywords: concertina; high speed telegraph; tinfoil phonograph; phonofiddle].

"Call For The Hidden Sounds": Johannes Bergmark. 6 1/2 pages; 17 pages.

Bergmark describes many of his invented instruments and theorizes about the inadequacy of most 'composed music,' calling for a more random, unpredictable process. [Additional keywords: butter bass; forked silver tongue; hedgehog; double trumpet; finger violin].

"Crow-Quill and 'Cat'-Gut: The Lautenwerk and Its Reconstruction": Mitchell Clark. 1+ pages.

A brief description and historical background of the Lautenwerk, or "lute-harpsichord," an offshoot of the harpsichord in which the utilized strings are made of gut. Clark also reviews two recent recordings which use reconstructed versions and which include a few pieces by J.S. Bach, who was known to have owned examples of this instrument [additional keywords: Kim Heindel; Gergely Sarkozy]

"Miscellany": Bart Hopkin. 1 1/2 pages; 2 photos; 2 drawings.

A presentation of notes, advice, and observations on twist-tuning: a technique especially suitable for harps and lyres wherein a single string is doubled back on itself, and held together at the tuning end by a cross-piece or yoke, and twisted to form in effect a single wound-together string which can be tuned by twisting more or less [overwinding; styro-harp].

"Speed Bump Music (The Work of Tim Buckett)": Mike

Hovancsek. 1 page.

An introduction to the work of sound sculptor Tim Buckett in a brief description of one of his ideas: speed bump music. This would be made by arranging the sounds created by wheels going over speed bumps.

Book Reviews. 2 pages.

Claire Jones: *Making Music: Musical Instruments in Zimbabwe Past and Present* [additional keywords: idiophones; marimbas; Shona Chizambe].

David Hogan Smith: *Reed Design For Early Woodwinds* [additional keywords: shawm; curtal; crumhorn].

Martin Vogel: *On The Relations of Tone* [additional keywords: intonational theory; graphic symbols/notation; frequency ratios].

"Hunting Down A New Sound: Modified Game Calls and Predator Calls": Jonathan Chang. 1 page.

The author describes the oft overlooked sonic source of game and predator calls, very similar to reed instruments, and ways to modify them [additional keywords: shawm; oboe].

"Circuit Bending & Living Instruments: The Trigon Incantor":

Qubais Reed Ghazala. 5 1/2 pages; 6 photos. 3 drawings. After a brief preliminary discussion of the beauty of chance and the rhythm of trains on tracks, Reed Ghazala goes on to describe his Trigon Incantor (see his article on the Incantor in EMI September 1992). The Trigon Incantor is an aleatoric electronic instrument made by deliberately applying random pressure using 2" steel balls to the surface of the electronic children's toy Touch and Tell. He also describes his manipulation of a piano which he refers to as the harmonic mute system, which creates harmonic overtones not unlike Cage's prepared pianos [additional keywords: indeterminacy; Speak & Spell; human voice synthesizers].

"Bamboo: The Giant Musical Grass": Richard Waters. 3 pages; 1 photo; 1 drawing.

The 2nd of 3 articles on bamboo, the 1st of which deals with species of bamboo and the 3rd of which deals with musical uses for bamboo. In this one Waters discusses optimum growing conditions, propagation, and ways of harvesting and curing.

VOLUME 11 #1, SEPTEMBER 1995

Letters and Notes. 6 pages; 5 photos; 2 drawings; 2 diagrams.

Will Dahlgren: Information on the prospect of Leon Theremin's availability to the public. Craig Packard: Stroh Violins still being used in Transylvania by Romanian and Hungarian Folk Musicians. Dennis James: owner and performer of Stroh-style phonoviolin and Stroh phonofiddle has soundtrack project to include theremin, Baschet cristal, ondes martenot, and phonoviolin. Robert Rich: Speed bump music; A musical bridge using a

textured roadbed plays Peter Gabriel melody as cars drive across it. Michael Meadows: ideas for tone roads, where grooves strategically placed on highways would play geographically correct songs (i.e. "Oklahoma" in Oklahoma). Blake Mitchell: How to create more resonance for the round surface of tubulongs and a description of one of his own aluminum tubaphones; he also describes book on marimba design in the making. David Strohauser: description of Magnum Tube-A-Tone, made of 6" diameter tubing played with foam padded paddles. Description of Mark Whitecage's soundsculpture, the Glass House Ensemble. Includes photos of the Bowed Horn, Crystal, and 12-Bolt Steel Cello. Homemade Instrument Day at Lincoln Center. Bulletin of Primitive Technology has several articles devoted to instrument construction without using modern technology. Cassette to accompany Volume 10 issues available.

"Sound-Making Mechanisms In Contemporary Children's Toys": Bart Hopkin. 6 pages; 11 photos; 1 drawing.

The author describes acoustic sound mechanisms used in a variety of contemporary plastic toys. Everything from a plastic nose whistle to a Teenage Mutant Ninja Turtle action figure are described. The different toys are categorized by their method of sounding: Spring and Diaphragm toys; Clacker Flexers; Edge Tones; Reeds; Accordion Squeezers; Bouncing Ball Percussion; Mechano-Acoustic Playback System; Magic-Sound Baby Rattle [additional keywords: Humanotone, labial reeds; aerophones; Zube tube].

"Music As Fragile As Its Material: The Classical Repertoire of the Glass Harmonica": Mitchell Clark. 2 pages.

A brief historical account of the glass harmonica, a general term for glass instruments sounded through friction. Clark notes that the armonica is now considered the first "American" musical instrument. He then goes on to describe two recent recordings, both including compositions written by Mozart for the glass harmonica, one including a Beethoven melodrama from the play Leonore Prohaska [additional keywords: glass-chord; glass bowls; musical glasses].

"New Discoveries from the Cloud Eight Archive of Musical Instruments and Fortean Musicology: The Prehistoric Brass/Woodwind Connection": Davey Williams. Illustrations by Hal Rammel. 4 pages; 6 drawings.

Humor/nonsense: In this second installment on musical instruments long buried in the Cloud Eight Archive's dusty storehouse (1st in EMI March 94), Williams establishes a lineage between brass and woodwinds [additional keywords: Thaddeus Partly Fardworthy].

"Nature On Record: Part 2": Rene van Peer. 5 pages.

The second installment of this series concentrates on recording soundscapes, focused mostly on the animals that live in them, to portray natural environments. The author explores issues such as the role sound plays in nature, the editing and portrayal of nature sounds, the increasing difficulty of locating places where

human technology does not infringe upon them, the process of recording, and listening to such recordings. Includes thorough discography [additional keywords: crickets].

"Perpetual Instruments and Requiem For A Radio": Qubais Reed Ghazala. 4 pages; 4 photos.

An inquiry into the communication of sound and emotion, theology and science. Reed Ghazala goes on to describe requiem for a radio, a recording of the process of a radio's destruction wherein the four movements are based on the structure of the Requiem Mass [additional keywords: muscae volitantes].

"Bamboo: The Giant Musical Grass": Richard Waters. 4 pages; 9 photos.

The final installment of this 3 part series on Bamboo — the 1st discussed varieties of bamboo species and their characteristics, the 2nd covered bamboo cultivation. Here, Waters focuses on tools and methods for working bamboo, then goes on to describe some of his own recent bamboo instruments, including his bamboo aeolian device (BAD), a hybrid of an aeolian flute and bamboo wind chime [additional keywords: wind flutes; aeolian harps].

"Ramblings": Bart Hopkin. 3 pages; 2 photos; 1 diagram.

The author describes his experimentation with the rotary rasp (later renamed Savart's Wheel), an attempt to create a sound device that does not create sound through natural oscillation based on the springy or elastic qualities in vibrating bodies, but instead uses an external mechanism to force a vibratory motion controlled by a driver. The instrument uses a system by which a plectrum scrapes over a surface with evenly spaced ridges at a steady speed, creating a recognizable pitch associated with some steady number of ridge-bumps per second. The article includes directions to determine scales [additional keywords: Telharmonium; Hammond Organ; drag stick/sound radiator].

Book Reviews. 1 page.

Hugo Pinksterboer: *The Cymbal Book*. [additional keywords: percussion; bells].

VOLUME 11 #2, DECEMBER 1995

Letters and Notes. 8 pages; 10 photos; 8 drawings.

Robert Grawi: A list of dream instruments and information on Gravikord. Ernie Althoff: A list of commercially available Nature

Sound recordings, additional comments on bamboo and children's toys [additional keywords: Fisher Price Happy Apple].

Rene van Peer: Thoughts on Speed Bump Music after traveling German and Dutch Freeways. Michael Meadows: A description of a rotary rasp type device using a Singer sewing machine.

Blake Mitchell: Wake the Marimba book; the Dancing Waters Color Instrument; bamboo instruments. Ultrasonic Tape [additional keywords: aeolian harps; singing telegraph wires]. Qubais Reed Ghazala and rare wind instruments [additional keywords: rotary rasp; Helmholtz' simple sirens]. James Coury: Interactive

Sound Sculptures [additional keywords: randomness].

“The Flutes and Sound Sculptures of Susan Rawcliffe”: Susan Rawcliffe. 5 pages; 10 photos.

The artist describes the construction, sound, and scale systems of her handmade ceramic flutes [additional keywords: Waterflutes; Pre-Columbian Flute Systems; Space Flutes; PolyGlobular Trumpet].

“Drums For The 21st Century”: Kris Lovelett. 1+pages; 1 photo; 1 diagram.

The author describes the unique qualities of Protocussion’s Lovelett Drum.

“The Busker”: Christopher White. 1 page.

A description of a sound-sculpture arranging objects that can be struck, plucked, scraped, etc. on a clothes rack in the abstract shape of a person, or busker (an english street musician or one-man band) [additional keywords: mallet instruments; percussion].

“The Nakers”: Kris Lovelett. 1 page; 1 photo.

Similar to its predecessor, the Naggara Drums, described in EMI June 1994, The Nakers consists of two clay dumbek-shaped drums that rest in a wooden table, a wood block lying between. Two foot pedals change the pitch of the two drums [additional keywords: pitch-varying pumps; mallet instruments; woodblocks].

“The Monochord”: Sasha Bogdanowitsch. 7 pages; 3 photos; 6 drawings; 7 diagrams.

The first part of this is a historical account, tracing the monochord’s origins to ancient Greece (6th century B.C.) and Pythagoras, through medieval, Renaissance, and Baroque eras to contemporary composers, including Harry Partch, Lou Harrison and Bill Colvig. This is followed by directions for the construction of a monochord and a mathematical illustration for generating scales as practiced by Boethius and two charts to help the reader generate many historical and “world” scales. With bibliography [additional keywords: numeric ratios; diatonic, chromatic, enharmonic, and tetrachordal scales; Claudius Ptolemy; Greek Perfect System; Herman Helmholtz; just intonation; trumpet marina; Vietnamese dan-bu; North Indian alapini/ekatantri vina; zither; Arabic kanun; clavichord].

“The Essential Thing the Pipes Play: Piobaireachd and the Great Highland Bagpipes of Scotland”: Mitchell Clark. 1+ pages.

The author describes this instrument and genre of music and what makes it distinct and popular in relation to other forms of bagpipe music. He then lists and reviews a small discography of Piobaireachd music [additional keywords: Scottish Border Pipes; Irish Vlleann Pipes; African/Asian Bagpipes].

“Historical Musical Instrument Patents: A Variable-Pitch Tuning Fork”: Notes by Bart Hopkin. 1+pages; 2 diagrams.

First in a series of articles on historical music patents, the author offers advice on researching patents as well as explaining the difference in patents today as compared to those at the turn of

the 19th century. This is followed by a brief description of Joseph C. Jenkins’ patented tunable tuning fork.

Book Reviews. 1+pages.

Trevor Wishart: Audible Design: A plain and easy Introduction to Practical Sound Composition [additional keywords: computer software; Fast-Fourier Transforms (FFTs); Sampling]. Jean Bonin: Piano-Beds and Music by Steam: An Index with Abstracts to Music-Related United States Patent Records, 1790-1874 [additional keywords: musical inventions].

“The Leskowsky Collection”: Daroczi Kiss Marta. Translated by Coventry House Kecskemet. Photos by Walter Peterne. 2+ pages; 10 photos.

The author describes the instruments and activities of Albert Leskowsky. The museum contains a collection of over 1000 musical instruments ranging from folk and classical instruments of various countries to one-of-a-kind sound-sculptures made by himself and others [additional keywords: The Fonograf Group; movable sound-sculptures; Hungarian Folk Music].

“From the Music Wing of the Dream Museum: Sky Harps”:

Qubais Reed Ghazala. 5 pages; 14 photos; 2 engravings. Reed Ghazala searches for a source to unexplained sonic phenomena/happenings in the guise of the sky harp, a sonic device existing in dimensions parallel to ours, occupying the same space but existing at alternate temporal wavelengths [additional keywords: Marin Marsenne and Harmonie Universelle; Michael Pretorius and Syntagma Musicum; elevation bells; towering sky harp; alien triskelia; Sound Theater Museum].

“Ramblings”: Bart Hopkin. 1+ pages.

The author gives some practical tips on how to increase reverberation primarily for stringed instruments and idiophones. Coil springs, sympathetic strings, sheet metal, and wires are cited. A very brief discussion of wind instruments is mentioned as well as the most effective reverberant devices: the acoustics of a particular space/room/physical locale [additional keywords: sitar; Viola D’Amour].

VOLUME 11 #3, MARCH 1996

Letters and Notes. 4 pages; 3 drawings; 7 photos; 1 diagram.

Peter Lundberg: Corrections in regards to the history of the monochord article that appeared in the previous issue, including diagram of Swedish Psalmodikon [additional keywords: J. Dillner]. Colin Hinz: the Motorchord [additional keywords: monochord; meccano instrument]. Barry Hall: Stone Fiddle [additional keywords: Johannes Bergmark; Egyptian rebabba; flute]. Roger Merrick: Mauricio Kagel’s recording with Stroh-like string-quartet, in response to EMI June 1995 article [additional keywords: Stroh violins]. Reinhold Banek and Jon Scoville: Sound Designs on Ten Speed Press. More Sound-making children’s toys: The Fly Swatter; The Jitter Ball; The Mango Bat — Refers to article in

EMI Sept 1995 [additional keywords: percussion; reeds]. Noise Gate Magazine. Partch Online.

“Rotating Tweeter Horn”: Keith Cary. 1+ page; 1 photo; 1 drawing.

The author discusses the construction of his Rotating Tweeter Horn which uses an old thrift store phonograph to add phase-shifting and tremolo effects to his Hammond M3 Spinet Organ [additional keywords: Leslieoid Baldwin speaker; Piezo Tweeter].

“Tweak Those Tones”: John Herron. 1/2 page.

Herron gives a brief list of methods he uses to modify sound (i.e. add reverb; warbling Leslie effect) in an affordable homemade manner.

“The Didgeridoo”: Steve Wilson. 3+ pages; 2 photos.

The author gives a brief history of this Australian Aboriginal instrument, describing how it transforms from eucalyptus or bamboo into a playable instrument, followed by a list of building materials and instructions, playing technique, describing the harmonics created, and circular breathing [additional keywords: didjeridu, aerophone; bamboo; PVC].

“A Conversation with Rex Lawson, Pianolist Extraordinaire”: Mitchell Clark. 3+ pages; 2 photos.

After a brief biography of Lawson and a description of the pianola, an instrument similar to the player-piano but with which the player controls tempo and phrasing, an interview discusses some intricacies of the pianola and its brief existence, cut short by the advent of the phonograph.

“Historical Musical Instrument Patents: 4 Patents Relating To String Instruments”: Cary Clements. 3 pages; 6 drawings.

The author muses on the subject of patents including brief discussions of 4 patents relating to stringed-instruments: Leo Fender’s Stratocaster Guitar Tremolo; Seth Lover’s Humbucker Pickup; Hans L. Deden’s Keyed ‘Cello and Mr. de Vlaminck’s nearly identical instrument; and Raymond A. Kidwell’s Mechanical Fingering and Picking Device For Electric Guitar.

“Making Marketable Musical Instruments”: Bart Hopkin. 3 pages.

The 1st of 4 articles concerning the making and marketing of unconventional instruments, Hopkin presents an introductory overview. Issues covered include: Cost of Materials; Sound Quality; Conceptual Hooks; Non-Replacability.

“The Historical Perspective”: Richard Cooke. 2+ pages; 3 photos.

The 2nd article in the series concerning the making and marketing of unconventional instruments, Cooke provides useful tips citing his own experience making and selling both standard and custom mallet instruments, including his Freenotes, using pentatonic or diatonic scales. Combining what is familiar with uniqueness is one key to his success [additional keywords: xylophones; marimbas; Imbarimba, percussion].

“The Reeded Mouth Bow”: Wayland Harman. 4 pages; 4 dia-

grams.

The author briefly discusses the mouthbow — mouth-resonated string instrument — and his attempts to create a mouthbow design in which the harmonic melodies created with it are more audible than the fundamental drone that often drowns it out. This is followed by construction ideas with diagrams, a short history of the mouthbow, and some playing instructions [additional keywords: reeds].

Video Review. 1/2 page.

Madeline Tourtelot with music by Harry Partch.

Enclosure 1: Harry Partch.

“Soundculture 96: An Exhibition of Experimental Instruments at the Falkirk Cultural Center”: Mitchell Clark. 1+ page.

The Soundculture Festival of 1996 explored the interface of new instruments and new music. Tom Nunn, Fran Holland, Peter Whitehead, and Oliver Di Cicco appeared; short descriptions of their unique inventions appear in this review. [additional keywords: found objects; recycled materials; Electroacoustic Percussion Boards (EPB); Sax Reeds].

“Ramblings”: Bart Hopkin. 2 pages; 4 photos.

The author discusses scraping and gives examples of his own scraped instruments that blend noise and tone: EMT Scraper Chimes; Scraper Flute; scraper flutes with tone holes; and rebar scraper chimes. He makes some recommendations based on his experience [chimes; aerophones; Darrel De Vore].

“Swords Into Plowshares: Percussionist, Z’EV, Discusses His Work With Titanium and Stainless Steel Instruments”: An Interview by Mike Hovancsek. 1 1/2 pages.

Hovancsek introduces Z’EV as a member of the revolutionary and controversial proto-Industrial/Noise/Punk/Techno group, Psychic TV and collaborator with Glen Branca. This introduction is followed by an interview geared primarily towards Z’EV’s interest in percussion and his ideologies of “Empowerment of the Audience” and “Shamamistic Qabala” [additional keywords: Rhythm; Ritual; found objects].

“What was Walden Pond to Thoreau? 150 Years of Forgotten Rumors”: Kenneth “Turk” Turkington. 1 1/2 pages; 2 photos.

In connection with the sundry articles on Aeolian harps in EMI Volume 10, Turkington reveals the rumor that Thoreau did in fact have a deep interest in Aeolian Harps to be true. Using a poem by Thoreau as an example, as well as having done extensive research on Emerson, the author associates the spirituality and aesthetic of the transcendentalists to the modus operandi of the aeolian harp.

VOLUME 11 #4, JUNE 1996

Letters and Notes. 4 pages; 2 photos.

Guy Grant: Corrections to didjeridu article that appeared in previ-

ous issue. Steve Smith: Marimbula and Rumba box. Dance and Percussion Performance: Stomp [additional keywords: found and everyday objects; brooms]. Siegfried Wendel and Mechanical Instruments Museum: Mechanisches Musikkabinett. Last Soundscape Newsletter [additional keywords: environmental sound awareness]. Bart Hopkin's Musical Instrument Design: Information for Instrument Making on Sharp Press. Air Columns and Toneholes by Bart Hopkin available through EMI.

"Liquid Percussion: An Interactive Installation by the composer/sound sculptor Trimpin Plays Music for the Rainy Season": Jake Seniuk. 4 pages; 3 photos; 1 diagram. The author traces Trimpin's interest in invention back to a long line of inventors whose credits include the alarm clock and describes his Liquid Percussion exhibit, which combines unfixed percussive rhythms created by dripping water, triggered both by viewers and programmed automatically [additional keywords: found objects; electronic/acoustic interface].

"Selling Unusual Musical Instruments: One Approach": David Strohauser. 4 pages; 4 photos. In this 3rd article in a series on the making and marketing of unconventional musical instruments, Strohauser, who operates the retail store and mailorder catalog Earthshaking Percussion (now called Earthshaking Music), offers some helpful tips on subjects such as advertising, selling on consignment, printing flyers and catalogs, having a showroom, interacting with potential customers, do-it-yourself marketing, and more.

"Marketing For Your Newly Invented Musical Instruments: From the Moment of Conception to the Attainment of Success": Robin Goodfellow. 2 pages; 20 drawings. Humor: The author presents a cartoon narrative of the marketing process.

"Fascinating Rhythm: Innovative Percussion Instruments": Tim Anderson and Janet Powell. 3 pages; 1 photo.

The 4th and final installment on the making and marketing of unconventional musical instruments features the founders of Fascinating Rhythm, who concentrate on percussive instruments for the education market in New Zealand. Anderson and Powell offer advice on such issues as marketing, the importance of feedback/criticism, pricing and expansion, putting any profit back into the business, whether to sell or manufacture, the problem of others copying your good ideas, and more.

"Fred 'Spaceman' Long: Troubadour from the 26th Century": Walter Funk. 2+pages; 4 photos. After giving a historical account of what led Long to invent instruments, Funk describes several of Long's electro/acoustic and electronic instruments that make up a family of instrument called Jokers. Features that are often found in this family include: springs, sheet metal resonators, electric pickups, acoustic sound generation and processing [additional keywords: found objects; singing saws; Gamelan; string instruments; violin].

"ElectroAcoustic Coil-Spring Instruments": Eric Leonardson. 1 1/2 pages; 3 photos.

A description of the Springboard, an electroacoustic instrument consisting of a large 10-gauge coil-spring, a thin metal can, a small barbecue rack, flat hardwood sticks and other materials, played by bowing or plucking. It's amplified by a contact microphone that can be hooked up to a mixer or amplifier [additional keywords: found objects; Gamelan; violin bows; daxophone].

"Woodcuts From an Obscure 19th Century Acoustics Text: Professor Pietro Blaserna's *The Theory of Sound in its Relation To Music*: With Notes by Bart Hopkin. 4+pages; 15 woodcuts. Reproductions of 15 woodcuts of various mechanical apparatuses culled from Blaserna's book, accompanied by captions, to demonstrate vibrational phenomena.

"Circuit- Bending And Living Instruments: The Harmonic Window": Qubais Reed Ghazala. 5 pages; 3 photos; 3 drawings. After a brief dreamlike introduction in the natural world, Reed Ghazala goes on to describe his Harmonic Window. The Harmonic Window is an aleatoric instrument that can stack small samples to stream together a complex thread of sound. What follows is an inquiry into his idea of a living instrument: circuit-bending an instrument expedites the aging process of the instrument so that it becomes impossible to retrieve a sound done in the past, as the sound transforms, ages. Lastly, he discusses whether circuit-bending instruments are "convulsing".

Book Reviews. 2 pages.

Eva Rudy Jansen: *Singing Bowls: A Practical Handbook of Instruction and Use* [additional keywords: Tibetan/Nepalese Singing Bowls; Crystal Bowls]. Philip Dadson and Don McGlashan: *The From Scratch Workbook* [Tubular Aerophones; Percussion; glass bells; truncated bottles].

"Ramblings": Bart Hopkins. 3 pages; 2 photos; 3 drawings. After a short description of his bentwood chalumeau, a glissando clarinet discussed more thoroughly in EMI Volume #2, August 1988, the author focuses on movable toneholes specifically relating to the clarinet. Includes construction tips and diagrams describing both the bentwood chalumeau and magstrip clarinets, and compares the differences between the two.

VOLUME 12 #1, SEPTEMBER 1996

Letters and Notes. 6 pages; 8 photos; 3 drawings. Anonymous: John Sheehan and the "Horn Guitar". Christopher Horne: Kitchen utensil music [additional keywords: mixing bowls; mixmasters; tea kettles]. Barbara Robben and Paetzold Recorders. Ginger Summit and Jim Widess' *The Complete book of Gourd Craft* available; focuses on how-to techniques on histor-

ical and contemporary instruments using the family's form. Equinox Productions and Dawn Kunzkowski and Earth Tone Drums [additional keywords: cans/food containers; specially treated paper; found objects]. Marianne Potje's film *Inspiration & Invention: The Musical Instruments of Hal Rammel* [additional keywords: cicliolin; the one-string snath, sound palette; cigarbox fiddle]. Longwave Instruments Pocket Theremin [additional keywords: MIDI]. Web Site and Internet discussion group listing. Ernie Althoff and bamboo sound machines and electric Friction Tube Set [additional keywords: keyboard-like control system].

"The Art of Sound Effects: Part 1": Ray Brunelle. 5 1/2 pages; 1 photo; 6 drawings.

The first part of a two-part article on the history of sound effects in theater, film, and music. After a brief history of drum sets, Brunelle traces the history of sound effects to ancient Greece and Shakespearean times. After which follows a list of major sound effects movers and shakers including: Jules White; Joe Henrie; Morrie Opper; Mel Blanc; Spike Jones; Monty Fraser; and Joe Siracusa, including descriptions of some of their contributions [additional keywords: bird calls; the "Rumble Cart"; the "Thunder Screen"; the "Slapstick"; duck calls; the "Latrinophone"].

"A Musical Instrument Workshop in Hanoi": Jason Gibbs. 3 pages; 8 photos.

In the first part of this article, the author profiles Ta Tham, a Vietnamese instrument builder who works at the National Conservatory of Music and at his own Hanoi Music Conservatory. He builds traditional instruments of Vietnam and those of his own invention. What follows is a description of Vietnam's most evocative instrument, the Dan Bau, tracing it historically and describing its materials and harmonic structure [additional keywords: dan tranh; dan ty ba; dan njuyet; dan nhi; zither; contrabasse Vietnamese].

"Some basics On Shell Trumpets and Some Very Basics on How to Make Them": Mitchell Clark. 4 pages; 4 photos.

The author offers some historical information, tracing the use of shells as trumpets to the Neolithic Era, making apparent the use of shells as signaling devices, and pointing out the use of these instruments in the ceremonies of many cultures around the world. He offers some basic instructions for two styles: 1) with the mouth hole at the apex, and 2) side-blown. Lastly, he discusses sound quality (i.e. pitch modification; harmonics), lists endnotes with sources, and lists a brief discography [additional keywords: Strombus Gigas; Japanese Hora; Charonia Tritonis; Tibetan dung-dkar; Bursa Bubo; Cassis].

"The Brain, Process Model and Other Phenomena": Grant Strombeck. 3+pages; 6 photos.

The author inquires into the notion of different brain types (i.e. left hemisphere equals logical; right hemisphere equals intuitive) and their different functions/strengths in regards to how one's disposition affects one's process of building instruments. He follows this inquiry with a process guide to help others make the

building of instruments more methodical and thorough and thus increase the potential of realizing one's goal. Photos of the author's instruments with description of construction and sound: Terminal paper Gourd harp; Jawlimba; Old Piano-String Drum; Flexy-Protuberance; Clock Chime Plus; Wobble-Bell. Short bibliography also listed.

"My Easy Stereo Tube-Preamp, Leslie Talk Box": John Herron. 1/2 page.

The author describes how he was able to create a Leslie effect with an old Norelco reel-to-reel tape recorder.

"The Monolith: A Two-Dimensional Keyboard for Pitch and Timbre": Jacob Durringer. 1+ pages; 2 photos.

Jacob Durringer describes the layout and capabilities of his alternative keyboard MIDI controller for performance and composition applications. He points out his prior frustration with traditional keyboard layout and the limitations one faced performing solo with one. His goal was to create a MIDI keyboard device capable of multi-timbral music that can be performed all by one person.

"The Quartal System: The Introduction of the Two-dimensional Musical Keyboard": Geary Thompson. 1+ pages; 6 diagrams.

The Quartal system is a concept for a two-dimensional pitch layout system. The author presents the Quartal system in two forms: as it would be realized as a guitar tuning and as a keyboard.

"The 'Terrence Dougherty'": TENTATIVELY, a cONVENIENCE. 1+ pages; 1 photo.

The author describes his aleatoric device named after the donor of many of its constituent parts which include: a sine wave/square wave generator; 2 cheap 4-channel mixers; and a primitive "ring modulator" among many other things. He describes in detail the way he combined and manipulated tape-player/radios with his mixers, noise generators, his percussive unit, Erector Set, and other devices [additional keywords: indeterminism; randomness].

"Two Generations of Experimental Musical Instruments": Tilman Kuntzel and Margrit Kuntzel-Hansen. 4 pages; 1 photo; 22 drawings.

The author describes growing up with his mother German music teacher and theorist Margrit Kuntzel-Hansen, who developed a system of music pedagogy for children, with home-buildable musical instruments as a central feature, and traces her influence on his own development as composer and sound artist. Included are constructions, accompanied by drawings, of home-buildable instruments for children.

Book Reviews. 1+ pages.

Chesley Goseyun Wilson, Ruth Longcor harnisch Wilson, and Bryan Burton: *When The Earth Was Like New: Western Apache Songs & Stories* [additional keywords: Tsii'edo'a'tl/Apache Violin; Apache Flute; Fipple Flute; Bamboo]. Daniel Goode, editor: *The Frog Peak Rock Music Book* [addition-

al keywords: Stones].

“The Plastic Ukulele and Guitar Inventor: Mario Maccaferri”: Cary Clements. 2+ pages; 4 drawings/diagrams.

As a part of EMI's ongoing series on musical instrument patents, the author describes the advent of a new kind of instrument made and manufactured by Mario Maccaferri in the late 1940's and 50's, inspired by capitalism and populism: instruments made with plastic. Also included is a brief history of Maccaferri himself, a renowned guitarist [additional keywords: plastic reeds; plastic guitars].

VOLUME 12 #2, DECEMBER 1996

Letters and Notes. 5 pages; 6 photos; 2 drawings.

Guy Grant: Addition to Mitchell Clark's Shell Trumpet discography from previous issue. C. Reider: Offers advice regarding movable toneholes discussed in article EMI Vol. 11 #1, June 1996.

Bob Grawi: “Enduring Rhythms: African Musical Instruments and the Americas” exhibit at The Metropolitan Museum of Art. Bill Sethares: Edible Instruments. Minnie Black. Soundscape Newsletter revived as The New Soundscape Newsletter. Lou Berger and his Drum Shtik, Player Piano. Brian Stapleton and his unique ukuleles. Starr Labs and Electronic Keyboard Layout. Corrections to Ray Brunelle article “The Art of Sound Effects, Pt. 1; Robert Mott & Jordan Young. Corrections to John Herron's “My Easy Stereo Tube-Preamp Leslie Talk Box.” Hal Rammel gives report on Newfoundland Sound Symposium.

“The Development of Bamboo Saxes From Argentina”: Angel Sampedro del Rio. Translated by Mariana Cecilia Iglesias. 4 pages; 7 photos; 1 drawing.

The author describes his *modus operandi* for building his bamboo woodwinds, including information on materials and mouthpieces [additional keywords: Adolphe Sax; Theobald Boehm].

“Circuit-Bending and Living Instruments: The Casio SK-1 Escapist Sample Shuttle”: Qubais Reed Ghazala. 6 pages; 3 photos.

The author describes his process of transforming a Casio SK-1 via creative short-circuiting into an aleatoric instrument. Includes thorough instructions. He has also creatively re-wired a Casio VL-Tone and Universe Device. This is accompanied by a brief patch description by Cynthia Striley that follows [additional keywords: LED; pitch dial; poly dial; sound envelope].

“Composing On The Escapist Sample Shuttle”: Cynthia Striley Ph.D. with Mark Milano. 1 page; 2 diagrams.

Accompanying the previous article wherein Qubais Reed Ghazala describes the Escapist Sample Shuttle, Striley offers a sort of guide diagram as an introduction to dealing with the instrument's inherent complexity.

“The Citara, type Alfonso el Sabio: A Medieval Psaltery”: Nelly

van Ree Bernard. 4 1/2 pages; 5 photos; 8 drawings.

Bernard describes her research and rebuilding of psalteries depicted in 13th Century manuscript of the Cantigas de Santa Maria del Rey Alfonso X el Sabio (Songs in praise of Mary of Alfonso X the Wise). She describes tuning and playing methods, and lists a short discography of recordings using this rare instrument [zither; harp; chordophone; harpsichord].

“Sla Pa Traden: Music on Transport Wires”: Atle Pakutsch Gundersen. 2 pages; 1 photo; 1 diagram.

The author describes his use of transport wires in Norway as a musical instrument. The transport wires are very long, strong wires traditionally used to transport goods up and down roadless slopes in Norway. By means of tapping on the wires; they are also used to as a rhythmic mode of communication similar to Morse code, for making known physical needs that would then be transported using the same wire. His methods of playing these wires were via bowing and knocking with a triangle beater. This is followed by a description of his performance collaborating with a saxophone quartet, broadcast via ISDN. He continues to explore the sonics of such everyday objects as fog horns, flagpoles, subways; sheeps with bells, etc [additional keywords: drones; found objects].

“The Art of Sound Effects: Pt. 2”: Ray Brunell. 7+ pages; 8 photos; 2 drawings.

In this second part of a two-part article, the author goes into detail accounting the progression of sound fx from the days of Vaudeville through the advent of the radio and finally film and television. He describes the process of using 78 rpm records to store fx and problems that faced those creating fx. This is followed by an account of re-recording technology and processing, including instrumental contributions from among others: Reuben Mamoulian; Don Foster's Foster Gun; Raymond Scott's Karloff and Circle Machine, Serial Doorbell, and Clavivox. Corrections to Pt. 1 are listed just following the conclusion of Pt. 2.[additional keywords: Bensch; Analog Waveform Generator; Telharmonium; Jack Foley; Kurzweil K2500; digital processing; soundtracks].

“Just Intonation and My Experiments with Musical Instrument Building”: Jeff Bunting. 2 pages; 4 photos.

The author describe his four instruments (all tuned in just intonation): Electric 12-string Slide Guitar; Two-stringed Electric Viola; Electric Diamond Xylophone (based on the ratios of Harry Partch's Diamond Marimba); and the Acoustic Lute [additional keywords: Otonalities; Utonalities; Southeast Just Intonation Center; Arp 2500 Analog Synthesizers].

“Instruments of the Cuban National Folkloric Dance Ensemble”: Steve Smith. 2 pages; 1 photo; 1 drawing.

The author offers some historical background on some instrumentation and dances that are part of Cuba's cultural heritage [additional keywords: clave; guiro; metallophones; marimbula; lamellaphone; sartenes].

"Ramblings": Bart Hopkin. 2 pages; 3 drawings.

In this article, the author discusses sundry alternative forms for electric pickups on string instruments. With each proposed potential transduction method, Donald Hall, professor of Physics and contributor to EMI shares his thoughts [additional keywords: radar; light sensor; Iron strings; Electromagnetic Soundboard Pickup].

VOLUME 12 #3, MARCH 1997

Letters and Notes. 6 pages; 6 photos; 7 drawings.

Eric Cadesky and Glass Instrument world wide web site [additional keywords: glass harmonicas; glass bells, glass xylophone]. Adam Mishaga and pyrophones. Karen Rauter and Woodstock Percussion [additional keywords: instruments for children; Anyone Can Whistle; Japanese Koto; African Mbira]. French percussionist periodical: Percussions. Bond Anderson's musical playground [additional keywords: metallophones; marimba]. Robert Moore's Drone Machine [additional keywords: suzuki melodians; Southeast Asian Mouth Organ; Irish Uilleann Bagpipes; Scottish Bagpipes]. James Boring and recycled material instruments.

"More Drums For The New Millenium": Ken Lovelett. 2 pages; 5 photos.

Lovelett describes a few of his drums including: orthogonal lap drum; thumb drum; belli drum; palm drum; finger drum; knee drum; udeck; dumbecks [additional keywords: handheld percussion].

"Industrial Waste and Musical Taste": Keith Spears. Photos by Jamie Noe. 3 pages; 5 photos.

The author describes two instruments he constructed with material collected from surplus auctions, junk yards, and Radio Shack: 1) drum set with drum pedal made with hammer and assorted cans mounted together with rebar steel rods and "kill box" — a set of on/off switches and 2) the Sampler Table which utilizes answering machine tape loops controlled with foot peddle [additional keywords: percussion; ambient sound; found objects].

"Colin Offord: Mouth Bows, Moonbells and More": An Interview with Warren Burt. 5 1/2 pages; 7 photos.

A discussion in which Offord describes a number of his instruments including: the Great Island Mouthbow; the Xylopt (a bailer-shell xylophone), Moonbells (large aluminum and brass bells); the Australasian flute (a Western flute with a bamboo mouth-piece); and the Bambudat (a set of large bamboo log drums). He also describes his performance group, The Great Bowing Company. [Additional keywords: Equal Temperament; kalimba; piano strings; found objects; percussion; marimba; conch shells; metallophones].

"Bertoia": Chris Rice. 1 1/2 pages; 2 photos.

This article focuses on the late Harry Bertoia, a sound sculptor

who released 11 recordings on his Sonambient label. Included are descriptions of 3 of his sonic inventions, 2 of which utilize beryllium copper wires that produce resonant long-lasting sound, with varying gauges producing a full array of tonal and timbral qualities. The last of the instruments described are gongs produced by sheets of metal [additional keywords: percussion; drone; ambient; found materials].

"Swift Sounds: Harry Bertoia's Sonambient LP's": Ian Nagoski. 2+pages; 1 photo.

The second of these two articles written the two editors of the cultural music journal halana focuses on Harry Bertoia's recorded material. Rather than describe each of his recordings, Nagoski gives an overview, a general description, with reference to particular pieces as guide posts [additional keywords: improvisation; ambient; drone].

"Ostenhorn": Phillip J. Ostendorf with Bart Hopkin. 5 pages; 11 photos.

Ostendorf relays his attempt to create a brasswind instrument able to produce all tones of a complete (Western) scale by control of lip tension alone, without valves, slide, or sideholes, by using additional, tuned air resonator tubes set just over the opening of the bell. His experimentation has led to many interesting creations including a design capable of playing a major scale over two octaves [additional keywords: brass; trumpets; tubas; french horns].

"Walnut Angklung: A 2x4 Contest Entry": Art Lietsman. 2 pages; 2 photos.

The author describes his entry into the Pacific Woodworkers Guild 2x4 Contest. A traditional Angklung consists of 2 or 3 bamboo tubes an octave apart and suspended in a bamboo frame (Liestman replaced bamboo with walnut). When shaken, a short tab at the bottom of each tube vibrates the tube and sounds the particular note [additional keywords: wood instruments].

"Alchemy In The Nineties. Turning Garbage Into Gold": Jan Jarvlepp. 3 pages; 3 photos; 3 diagrams.

The author wrote a concerto for recycled garbage and symphony orchestra combining pitched and unpitched instruments. He briefly describes where certain recycled household objects are used throughout the various movements as well as explaining his method of mounting the devices for performance [additional keywords: found objects].

"Ramblings": Bart Hopkin. 3 pages; 1 photo; 2 diagrams.

Following some background on the intricacies of modes of string excitation and its relationship to the bridge and soundboard, the author describes his experiment building a bridge and soundboard for an acoustic bass guitar.

"Greyworld Sound Sculpture": Andrew Shoben. 1+ pages; 2 drawings.

Greyworld is an established group of sound artists who create sound installations and sculptures deconstructing traditional

notions between work and play. In this article, the members of Greyworld describe three of their recent inventions. The "Soundwall" is made up of a number of mounted vertical bars that play a melody when played in succession. The "Layer" is a carpet or floor covering which translates human movement upon its surface into music by assigning segments MIDI-based sounds which are then walked on. "Shopping" was an installation using sounds extracted from consumer soundscapes.

VOLUME 12 #4, JUNE 1997

Letters and Notes. 8 pages; 2 photos; 5 drawings.

Ray Wilding White: Writes on the influence of the drum set, in response to Ray Brunelle's article in previous issue on sound effects [additional keywords: trap set; Dee Dee Chandler; Jean Robicheaux]. Colin Hinz: Mechanical Musical Digest. New home for one of the world's leading collections of historical and contemporary musical instruments: Cite/Musee de la Musique. I AM LISTENING video available: an exhibit of sound sculpture linking the visible with the audible including Charles de Mestral and Raymond Gervis. Frederick Crane: Alessandro Moreschi, The Last Castrato? Tonehole Liberation: Response to June 1996 "Ramblings" from Angel Sampedro del Rio. Susan Rawcliffe's report on the 1997 NAMM Show. Longwave Instruments, makers of theremins have new instrument: Little Infinite Frequency Expander (LIFE). Peter Etcetera: Hand drawings of instrument ideas with commentary.

"The Free Music Machines of Percy Grainger": Rainer Linz. 2+ pages.

Perhaps best known in Europe and America as a "traditional" composer/arranger of brass band and English Folk tunes, Grainger's use of "chance" composition in 1912 in fact predates John Cage. After some historical context including his guiding theory of Free Music, from which all his future ideas would spring, the author describes some of the instruments that were the fruit of Grainger's collaborations with physicist Burnett Cross. These include: Solovoxes; The Reed-Box Tone-Tool; The Oscillator Playing Tone-tool; The "Hills and Dales" Machine, etc. Linz states that Grainger was never able to achieve his desired theory of Free Music with these or any instruments. He is no doubt a dramatically overlooked figure of the avant-garde. The Grainger Museum is at the University of Melbourne, Australia [additional keywords: chance; atonal; indeterminism].

"The Cat's Cradle: 50 strings, 82 pickups, and 2 amplifiers": John Gzowski. 3 pages; 3 photos.

The author describes the building and playing of his instrument comprised of a Chapman Stick-type board with a removable/interchangeable fretboard played somewhat like a guitar and a set of additional sympathetic strings that react to the frequencies from the stick. It also includes an infinite sustain system, not unlike what an E-Bow does [additional keywords: micro-

tonal; equal temperament; harp; sitar].

"The Loop Group Brass": Ray Wilding-White. 2 pages; 8 photos; 1 diagram.

After inheriting some old brass instruments, the author (with some help) bent and welded them into interesting and unique shapes that were used in performances. Scales for each horn shown [Additional keywords: horns; trumpets; tubas].

"The Sound Art of Robert Rauschenberg": Mike Hovancsek. 1+ pages.

A description of Rauschenberg's forays into the sonic medium. Includes brief description of :Music Box; Broadcast; Oravle; Dynamic Labrynth; Open Score; Soundings; and Mud Muse, many of which were interactive pieces that stressed the unique meeting of each individual with the work [additional keywords: John Cage; Merce Cunningham; Johan Kluver; Jean Tinguely; Niki de Saint-Phalle; Indeterminism].

"Two-Dimensional Keyboard Patterns": Niles Hokkanen. 4 pages; 14 diagrams.

The author describes the pros and cons of many different tuning layouts, concentrating on accordians, keyboards, and foot-bass pedal board diagrams [additional keywords: organ; piano].

"Circuit-Bending and Living Instruments: The Casio SA-2 Aleatron": Qubais Reed Ghazala. 4 pages; 3 photos.

Reed Ghazala combines several methods of circuit-bending: body-contact control, human voice synthesis, digital samples, the equal temperament scale, in his Aleatron and describes how to modify and manipulate it [additional keywords: aleatoric instruments].

"The Helikon": Mitchell Clark. 1 page.

Referring to Mount Helikon, home of the muses, this instrument, following the simpler Monochord, is known to have been used for demonstration, in basic geometric terms, of the harmonic relationships of the perfect consonances plus the tone: 2/1; 3/2; 4/3; and 9/8. The author explains the geometric format [additional keywords: stringed instruments; lyres; zithers; Ptolemy; Aristedes Quintilianus; Didymus].

"Book Reviews": Mitchell Clark and Bart Hopkin.

Robert Green: *The hurdy-Gurdy in 18th Century France*. Includes brief discography in review [additional keywords: stringed instruments; Baroque Era; drone; lutes; guitars].

Michael J. Pagliano: *Everything You Should Know About Musical Instruments But Didn't Have Time To Learn* [additional keywords: Instrument Manufacturers; flutes; clarinets; saxophones; oboes; bassoons; brass; violins].

Reynold Weidenaar: *Magic Music From The Telharmonium* [additional keywords: keyboards; Hammond Organs; Thaddeus Cahill].

[additional keywords: drums; percussion, children's instruments].

"Chinese Wind-Driven Kite Flutes": K.U. Wahl. 4+ pages; 6 photos; 6 drawings.

Part one of this article consists of some historical background (dating back to 960 AD) on Kite Flutes. Part two consists of instructions on how to build a small Kite Flute, including excellent photographs of examples. Includes bibliography [additional keywords: aeolian harp; zither].

"Slate": Will Menter. 4+ pages; 9 photos.

The author describes his fascination with slate as a material (for instruments) and provides interesting background on the British slate industry's exploitation of the Welsh and its consequences. He describes his slate marimbas and llechiphones. Finally, he describes two of his collaborations with other traditional musicians and sound sculptors and their consequent performances combining both his social and musical interests [additional keywords: xylophones; harp; stones].

"Building Modular Drums From Plastic Pipe and Plywood": Bennett Cohen. 4+ pages; 8 photos; 1 drawing.

The author describes his modular, or inter-connectible, drums and goes into detail on their construction and use of materials, particularly plumbing fixtures available from a hardware store.

VOLUME 13 #2, DECEMBER 1997

Letters and Notes. 9 pages; 6 photos; 5 drawings; 1 diagram.

Zeno Okeanos: Automobile Ah-Ooh-Ga Horns [additional keywords: electric motors]. John Coltman: The Old Model-T Horn.

Susan Rawcliffe: The environmental dangers of PVC tubing.

Joan Bell Cowan: The Orff Institut in Salzburg, Austria; "Canya" or arundo donax [cane reeds; bamboo; guiro; woodwinds]. Bill Mauzey: On the benefits of Gorilla glue for gluing styrofoam.

Jason Gibbs: In response to a letter in EMI June 1997 about Dan bau. The Stranger Creek Instrument Maker's Catalog [now no longer in business] is a mail-order outfit stocking books and resources on instruments and instrument making. The Backpacker Ukulele from Martin Guitar Company. Five ideas for possible strange sound makers from Sarn Richard Ursell. Frank Pahl's: Automatic Marimba and Virtual Pet: Gerbil. The Pipeline Festival at Podewil, Berlin. Websites of interest to EMI readers. The New Zealand Deagan Organ Chimes [additional keywords: angklung; vibraphones; xylophones]. Ray Wilding-White on Monday Morning at The Gargoyle Works: a score for chairs that are scraped, rattled, dragged on the floor, etc.

"The Talking Machine: A Mechanical Speech Synthesizer": Martin Riches. 5 pages; 1 photo; 7 drawings/diagrams.

The second in a two part series devoted to the subject of speech synthesis. Here, Riches describes the construction and research for his mechanical speech synthesizer. Includes bibliography.

VOLUME 13 #1, SEPTEMBER 1997

Letters and Notes. 9 pages; 4 photos; 5 drawings.

Grant Strombeck: Noise is our fundamental nature. Tony Cowdroy: In response to Bill Houck's letter in March '97 issue; describes a cuckoo call. Bob Grawi: Natural horns without valves; Gravikord, an electric diatonic double harps. Peter Etcetera: The Drumball. Dr. Guy Grant and Oddmus, a free e-mail list covering experimental, ethnic, and unusual musical instruments. Corrections to article about a sound device called LIFE. Het Apollohuis, the Dutch venue for innovative art and music forced to close. New organization for Jew's Harp enthusiasts. Randy Moeller and the Vulcan Lyrette. Mandocrucian's Digest, the mandolin magazine no longer publishing; back issues still available. Gerard Westendorp and Pyrophones. Keith Spears' and Industrial Chimes and buzzers. Ben Cohen on instruments built from ultrasonic humidifier tanks. Dave Knott and the Metaphone. Sam Pappas and the Horn Harp. Websites of interest to EMI readers.

"Speech Production and Four Historical Speech Synthesis Projects": Martin Riches. 6+ pages; 3 photos; 3 drawings; 4 diagrams.

In the 1st of 2 articles on speech synthesis, the author describes the mechanics of speech production. This is followed by a description of four important historical synthetic speech devices: Christian Gottlieb Kratzenstein; free reed organ reed; Von Kempelen's Speaking Machine; Joseph Faber's Euphonia; The Voder (Voice Operation Demonstrator).

"Sirens: Pt. 2": Bart Hopkin. 3+ pages; 2 photos.

In the second part of a two part series, the author describes a pair of simple musical sirens he made with the idea of passing on some of the practical design and construction information picked up along the way. Includes a scale making chart [additional keywords: electric motor].

Book Reviews. 1 1/2 pages.

John Edfors: Woodwind Instruments From PVC: Guidelines For Constructing Experimental Instruments From PVC Pipe and Related Materials [additional keywords: flute; fife]. Bill and Mary Buchen: Urban Sound Park Design John Madin: Make Your Own Wacky Instruments Robert B. Sexton: Method For The Theremin, Book 1, Basics; David Winters: Natural and Artificial Harmonics For The Guitar

"Balloon Boom": Text and drawings by Robin Goodfellow. 1+ pages; 3 drawings.

This article is dedicated to building the Tin Can Balloon Drum, a very simple yet resourceful percussive device, with an eye to its use with children. In addition, Goodfellow offers some cultural lore, rudimentary principles of sound, a song with which the instrument can be used and lastly, a small list of further reading

"Scrappy Scrapers": Text and drawings by Robin Goodfellow. 2 pages; 3 drawings; 1 score.

In the second of a series of illustrated articles, Goodfellow offers some cultural historical context on instruments that are scraped. She provides simple instructions on how to construct a few instruments simple enough for children, and presents a score to attempt after having built some of these sound makers [additional keywords: The Nigerian ivuur; dikwaksa from Zaire; idio-phones; gourds; cheese graters; light bulb protectors; Korean Yu].

"Making Tube Drums and Styrocellos: Two Really Simple Instruments": Skip LaPlante. 2 1/2 pages; 3 drawings/diagrams. LaPlante herein describes two very simple instruments using recycled or discarded materials. The mailing tube drum is just that, with one plastic endcap removed. The styro cello combines wood and cardboard tube, styrofoam, wire, a turnbuckle, and two bolts into a stringed instrument [additional keywords: percussion].

"Circuit-Bending and Living Instruments: The Solar Bug Box": Q.R.Ghazala. 4 pages; 4 photos. Reed Ghazala describes his light-powered and light-modulated synthesizer, at the heart of which is a very basic "tone burst" generator. This aleatoric device creates insect-like sounds among other things and was inspired by unknown ambient natural sounds.

"Sounding Antiquity: Reconstructions of Ancient Greek Music": Mitchell Clark. 3+ pages; 1 drawing. Clark focuses on musical reconstructions based on surviving notations from ancient Greece as reflected in 5 recent recordings (a discography is included). He takes into consideration the issue of authenticity and the anachronistic use of certain instruments [additional keywords: lyres; harps; lutes; zithers; reed-pipe aulos; pitched idiophones; historical musicology; music archeology].

"Scratching the Surface: The Balloon in My Life": Ricardo Arias; Drawings by Naomi Culla. 5 pages; 1 photo; 11 drawings. After describing what led him to meta or nontraditional/ formal music, Arias offers sound-production techniques that he has used to make balloon music. This is followed by the story of the Balloon Kit: a contraption that allows for a kind of one-person-balloon-hand act. Includes bibliography [additional keywords: elastic aerophones; rubber, latex].

"Scot Jenerik's Fire Music": Mike Hovancsek. 3 pages; 6 photos. After a bit of background on Jenerik's *modus operandi*, the author describes Jenerik's use of contact mics in his gloves and knee pads to amplify lit sheets of metal, a flame-thrower harp and an 8 ft. 2x4 strung with springs and piano wire. Photo cells trigger various sound sources according to the height of the flames, Hovancsek conducts an interview with him [additional keywords: propane; everyday objects].

"Historical Patents For Horned Violins": Cary Clements. 5 pages; 14 drawings.

The author looks at 14 horned violin patents issued in the U.S. between 1900 and 1949 that were innovations based on or very similar to the Stroh Violin (see EMI June 1995): a violin with a horn to increase its volume for use in recording.

VOLUME 13 #3, MARCH 1998

Letters and Notes. 4 pages; 1 photo; 1 drawing. Cyrus Heiduska: On a "found" instrument made up of holes in a road. John Chalmers: In response to Mitchell Clark's "Sounding Antiquity" article on Ancient Greek music in previous issue; Chalmers mentions another relevant recording and mentions scales, etc [additional keywords: diatonic scale; Pythagorean scales; tetrachords]. Ranjit Bhatnagan: Recommendation for two sirens not mentioned in sirens article in EMI September 1997. Greg Phillips: Computer program allows the user to simulate tunings for chimes, recommends lengths, and gives reference tones. The trumpet call of the parasauropodus, an herbivorous duck-billed dinosaur. Web sites of interest. Erie Art Museum exhibit on resonator guitars. Traditional Orchestrons (but newly made) available through Hammacher Schlemmer.

"The Free Reed": Michael Hearst. 4 pages; 2 photos; 14 drawings.

The author, a former harmonica technician at the Hohner Company, defines the free reed, offers brief construction tips (including materials, what determines pitch, etc.). Following this, he gives a fascinating history of some free reed instruments dating back to China 3000 BC (the sheng) to the present with instruments such as harmonicas, the Claviola, and the Mellotron [additional keywords: bandoneons, accordions, melodicas, pianets, etc.].

"Poeme Electronique: A Building as an Instrument": Ray Wilding-White. 6 pages; 6 photos; 8 drawings/diagrams.

The author describes the creation of the Philips Pavilion at the World Fair in Brussels 1958. Also included is a description of the Edgard Varese's compositional process and how mathematics played a profound role in both the construction of the building and the sound that filled it. Further sources listed [additional keywords: Xenakis; Le Corbusier; L.C. Kalf].

"Hunka Hunka Churnin' Wood: A 2x4 Contest Entry": Art Liestman. 2 pages; 3 photos.

Liestman describes his entry into the annual Pacific Woodworkers Guild event in which each contestant is to make any project from a single piece of wood that measures 2 inches by 4 inches by 8 feet. Described herein is the construction of his invention: a xylophone pitched to an Indonesian scale controlled by a crank. He won 1st prize [additional keywords: xylophones; wood; marimbas].

"Empty Vessels: Readymade Resonators for String Instruments": Peter Whitehead. 3 pages; 11 photos; 1 diagram.

Instrument innovator and composer Peter Whitehead describes ways of building plucked string instrument (i.e. banjo, bass lyre) using found or reused metal containers as resonators (i.e. cookie or ham containers; pie tins) and then describes bowed instruments (i.e. tamboura, etc.).

“A Sonic Odyssey and Quest For Clarity”: Peter Horsefield. 4 pages; 1 photo; 7 drawings/diagrams.

A description of a few of the author’s stringed instruments which include: harps; dulcimer; and musical kites.

“Sound Sculpture From Hungary: Photographs of works by Rezso Moder and Tibor Budahelyi. Notes by Kim Johnson. 3 pages; 9 photos.

This article presents photos and a brief introduction to two Hungarian (sound) sculptors based on catalogs sent to EMI via Albert Leskowsky [additional keywords: metal; wood].

“Ellen Fullman’s Long String Instrument”: Mike Hovancsek. 2+ pages; 2 photos; 1 diagram.

A description of The Long String Instrument, made up of 120 80ft long strings, which produces sound by rubbing rosined fingers along the length: vibration travels from end to end (as opposed to perpendicular to the string) [additional keywords: drone].

“Ramblings”: Bart Hopkin. 1+ pages; 1 photo; 1 drawing.

The subject of this article is building a simple harp with a roasting pan. It turns into a lesson on simplicity itself: Hopkin describes his unsuccessful attempt to create a harp with 56 strings cross-strung on a 15” roasting pan. He then tries the same technique with 28 strings with more success [additional keywords: zithers; lyres; strings].

“From Flutes To Nuts or A Spring Egg Roll”: Text and drawings by Robin Goodfellow. 3 pages; 11 drawings; 1 score.

The third in a series presenting ideas for musical instruments simple enough to be made by children, offers a lesson plan, includes rudimentary principles of sound, elements of cultural lore, and a score. The subject of this article is eggshells and how to turn them into ocarinas: technically an enclosed chamber in which air vibrates when an air stream is blown across the edge of an opening in the chamber [additional keywords: woodwinds; globular flutes, vessel flutes].

“Bucket Drum Toms and The Marching Marimba”: Jody Krustal. 3 pages; 7 photos.

An instructional guide to using buckets of all kinds as drums and percussive devices (i.e. marimbas).

Books Reviews. 3 ½ pages

Nelly van Ree Bernard: *The Tuning Monochord Monchordio ‘Bermudo’: A hypothetical reconstruction of a 16th century Iberian clavichord and its employment and The Keyed Monochord: Rediscovery of a forgotten instrument.*

Harry Partch: *Enclosure: 3.*

Kathy Teck, Roy Doty and The Hit-It Band: *Bears Beat Bowls In The Bathtub.*

J.C. Kleinbauer: *How To Build a Barrel Organ: An Adventure In Plastic.*

VOLUME 13 #4, JUNE 1998

Letters and Notes. 9 pages; 8 photos; 4 drawings.

Crane: Corrections regarding the architect of Phillips Pavilion: Le Corbusier or Iannis Xenakis? David L. Roop: Dreams of Instruments (i.e. percussive pillow). Bill Mauzey: Industrial-grade cardboard tube drums with brief instructions. ZHANG (aka Jonathan Chang): on altering a Playskool “Sax-o-fun”. Dwin R. Craig: Responds to several past articles with information and advice on speech synthesis machines; patents; what can be done with a clear Polycarbonate Fluorescent Lamp Guard by Liteway; and a description of a single-string bass fiddle. Mugwumps Instrument Herald, a publication devoted to folk music instruments of all sorts, revived. DuPont buys Remo Percussion. All-Wood Bongo made by Puerto Rican Percussionist Pedro Barriera. Percussion by Roberta Berman Quinn [additional keywords: xylophones; chordophones; slit drum; idiophones; mbiras]. EMI a sponsor of the Musicians and Instrument Makers Forum (www.mimf.com). Paragraph inadvertently omitted from Ray Wilding-White’s article “Poeme Electronique: A Building as an Instrument.” Web sites of interest. Sound Sculpture by James Harbison.

“John Kaizan Neptune and Shakuhachi Innovation”: Monty H. Levenson. 2 pages; 1 photo.

In this first part of a two-part series on J.K. Neptune, Monty Levenson of Tai Hei Shakuhachi, discusses John’s work with shakuhachi, including shakuhachi making, performance, and traditional culture. Monty also speaks of his own work, in collaboration with Neptune and others, in developing special technology to bring consistently high results at affordable cost to an instrument known for the elusiveness of its most desired qualities [additional keywords: woodwinds].

“Take Dake”: J.K. Neptune. 3 pages; 8 photos.

The second of a two-part series, here Neptune discusses his forays into the creation of an all-bamboo ensemble including drums, percussion aerophone, free-bar instruments and winds. There are brief descriptions of Baliphone; Bambass; Bamboo Drum Kit; Tube Congas; Bamboo Frame Drums; Wind Chimes; Vduboo, Shakers.

“The “Funny” Music of Neil Feather”: John Berndt. 5+ pages; 6 photos.

After a brief history of Neil Feather’s background, Berndt describes in some detail a few instruments de-of constructed by Feather, including the Nondo; Former Guitars; Vibulum; and others.

"Totems of Imagination": Grant Strombeck. 2 pages; 3 photos. The author muses on the subject of invention, what makes something art, and the lost spirit of the artless. The pictures of three of his instruments: the Sound Tree; the Gong Totem; and Maquette (Dream Harp) accompany his reflections [additional keywords: metal; bamboo; bells; wires].

"Plicker Plucker": Text and Drawings by Robin Goodfellow. 4 pages; 13 drawings; 1 score.

This article, the fourth in a series presenting ideas for musical instruments simple enough to be made by children, offers a lesson plan, includes rudimentary principles of sound, elements of cultural lore, and a score. Here, Goodfellow describes a rubber-band-and-styrofoam version of a medieval psaltery, a stringed instrument somewhat similar to a zither. Also included is "A Children's Instrument For Observing Quantifiable Tension": An illustrated guide for making a very simple device using string, a paper cup, cardboard, and coins to demonstrate quantifiable tension.

"The One-Footed Drum Kit": Niles Hokkanen. 6 pages; 13 photos.

The author describes what led him to using midi pedals and drums to accompany his mandolin, leading to a one-person band. He describes in great detail the construction of his unique foot pedal, which allows the player to play an entire battery of drums and cymbals with one foot alone.

"The Dworkian Register": Q.R. Ghazala. 4 pages; 3 photos. After describing his interest in 360-degree ambient sound fields, Reed Ghazala describes his Dworkian Register. The Dworkian Register is an aleatoric instrument made by circuit-bending four pressure-sensitive sound strips like those found in children's books.

"Electromagnetic Possibilities": Paul Rubenstein. 3 pages; 5 photos.

The author tells how he discovered a world of possibilities using electromagnetic pickups, and describes some of his instruments and their custom-designed pickups. Some of those instruments are: The Viotar, a bowed four-stringed version of an electric guitar; the Electric Saron, a xylophone-like gamelan instrument made of industrial surplus steel rods; M'birangi, a 32 key thumb piano-like instrument; Cellotar, an improvement on the viotar with 6 strings; and the Autodrone, a two-stringed bass run by a small motor and used to drone continuously.

Book Reviews. 1+ pages.

Jason Lollar: *Basic Pickup Winding and Complete Guide To Making Your Own Pickup Winder* [additional keywords: electromagnetic pickups; coils].

Harvey Rudoff: *The Practically Complete Guide To Almost Real Musical Instruments For Nearly Everyone*

Anonymous: *The Anonymous Family Reunion*.

VOLUME 14 #1, SEPTEMBER 1998

Letters and Notes. 5 pages; 7 photos; 1 drawing.

Peter Whitehead: Adding a pickup to something does not make it an instrument. Lon Granger: Neodymium magnets added to electric guitar strings. Notes: Tonehole placement software by Glenn Engstrand available on web. Clara Rockmore, theremin virtuoso, died May 10, 1998 in Manhattan at age 88. Oddmusic forum moves to www.onelist.com. Glass Music International, newsletter and festivals contact information. Mariolina Zitta releases her CD *Perle de Grotta: La Musica delle Stalattiti* featuring percussion on cave stalactites. Jason Gibbs: Ta Thâm, Vietnamese instrument inventor died on October 19, 1997 in Hanoi at 68 years old.

"Deus es Machina; Fleshtone and the Godbox Project": Monte Thrasher. 5 pages; 4 drawings.

The author describes his experiments and discoveries in infrasound (frequencies between 10 and 20Hz) with the "Godbox". He also examines the occurrence of infrasound in animal calls, the noises of modern life and primitive instruments. Finally, he presents a theory of why infrasound has such a strong affect on the human being.

"The Enigma of Whistling Water Jars in Pre-Columbian Ceramics": Brian Ransom. 4 pages; 8 pictures; 2 drawings.

This article is a presentation of the author's research on Peruvian whistling jars. There are two types: single-chambered, breath-driven whistles and double-chambered, water-driven whistles. Variation in sound quality is attained by changes in whistle chamber size, whistle enclosure, sound hole size and angle of air delivery. [additional keywords: wind instruments; ceramics; primitive instruments; whistles].

"Toy Pianos; No Longer Toys!": Margaret Leng Tan. 5 pages; 6 pictures; 2 drawings; 2 diagrams.

Here the history of the toy piano is traced from its German origins in the nineteenth century through its life in the United States. This article is primarily a chronicle of the production of toy pianos in the United States and includes information about the evolution of its uses around the world. Two diagrams explain how the keys function. [additional keywords: toys; children's instruments; glockenspiel; glass dulcimer; metallophone; John Cage.]

"Three more from Ángel": Ángel Sampedro del Río. 3+ pages; 8 pictures; 2 drawings.

The author discusses troubleshooting issues with reeds, mouthpieces, toneholes, harmonics and bore on his finely crafted bamboo clarinets, saxophones and ocarinas. He also gives a history of the influences in his designs. [additional keywords: Argentina; Argentinean folk instruments.]

"How to Scramble Your Casio SK-1 Without Modifications": Walter Funk. 1+ pages.

Looking to extend the functions of your Casio SK-1 sampling keyboard? The author describes how to access the "warp" mode with the right combination of buttons.

"MicroPiano-izmo": zHANG. 2+ pages.

This article opens with a few nice quotes on non-traditional instruments and free improvisation. After giving information on the toy piano, John Cage and contact microphones, the author moves on to present his concept for a prepared toy piano.

"The Icelandic Lithophone": Elias Davidsson. 3 pages; 3 photos. The author begins with a history and geography of musical stones of the world. From his first discovery of a ringing stone in Iceland, he describes his construction and playing of lithophones.

"Mellow Lamellaphones": Robin Goodfellow. 5 pages; 9 drawings; 13 diagrams; 1 song.

In her fifth ExMI pedagogical article, the author presents ideas for lamellaphones simple enough for children to make. Construction is illustrated with beautiful diagrams. Instructions for leading a song with children and cultural information on various African lamellaphones are included. Includes bibliography. [additional keywords: mbira; kalimba; recycled materials.]

"Browsing my Mind, or Dwinstruments I Have Known": Dwin Craig. 5 pages.

This piece is a humorous list of many short ideas. The author writes about some uses of speakers as microphones, uses of integrated circuits for sound, uses of polycarbonate tubing, straws, clay, pegboard, plumber's epoxy, Velcro, neon lights and more. [additional keywords: wind instruments; ASCII.]

VOLUME 14 #2, DECEMBER 1998

Letters and Notes. 9 pages; 6 pictures; 3 drawings.

Judy Dunaway: Compositions for balloon. Uli Wahl: Aeolsharfen; derWind als Musikant is a very good book about Aeolian harps.

Glenn Engstrand: A list of ExMI relevant websites. Notes: Patrick Ozzard-Low publishes 21st Century Orchestral Instruments: Acoustic instruments for alternative tuning systems. Center for the study of free-reed instruments has opened:

www.gsuc.cuny.edu/freereed/. Two instruments with pictures from Curtus Settino [additional keywords: pot lids; galvanized pipe]. Several instruments with pictures from Werner Raditschnig [additional keywords: aluminum; electro-acoustic instruments; spatial installation]. Four string instruments from Peter Head, with pictures. Peter Struble installs outdoor playground instruments for children in Austin, Texas.

"A Flute-Clock Caper": Robert Moore. 4+ pages; 2 pictures; 1 diagram.

As a retirement gift for a fellow shop-worker in Canada's Defense Research Lab, the author and his co-workers built a flute-clock. This instrument is a small barrel organ and is not a time keeper.

The author describes the research, planning, construction and mechanics of this cooperatively build instrument. References to relevant books are conveniently included. [additional keywords: mechanical instruments; music-box; organ].

"Hybrid Winds": Linsey Pollak. 4 pages; 5 pictures; 5 diagrams. The author describes a few of his own wind instruments and provides information about their background. His instruments are based mostly on Eastern European folk instruments. [additional keywords: clarinet; gaida; tarogato; zurna; suona; ney; kaval; supelka; koauau; fleahole; carrot flute; rubber gloves]

"Motormouth; A Speaking Machine": Martin Riches. 4 pages; 1 picture; 2 diagrams.

This article is a follow-up to one from ExMI September 1997 (Volume 13 #1). The author explains the function of a computer-controlled, mechanical human voice synthesizer he has developed. He also breaks down the sounding of a word into the required actions of each component of his contraption. [additional keywords: phonetics; electric motors; speech organs; programming]

"Galloping Gamelan": Robin Goodfellow. 4 pages; 4 drawings; 2 songs.

This is the sixth if the author's series on simple instruments for children and people of all ages. The article opens with information on Balinese gamelan and goes on to explain the assembly and application of a gamelan set of tin cans. Includes a list of websites related to gamelan. [additional keywords: recycled materials; tuning systems; Sharon Anway]

"Tank Music": Reed Maxson. 2 pages; 4 pictures.

This article is a short report on the author's musical activities using custom-welded steel tanks. He created a string bass using nylon rope and a 2000lb winch and played with "quasi-automated" components like swinging saws.

"Hyperbiwa": Jhon Miura Hardy. 3 pages; 4 pictures; 2 drawings. The author begins by briefly recalling the long history of the biwa (a family of plucked string instruments) in Japan. He clearly describes how the various aspects of the instrument function and how it was traditionally used. His own modern adaptation of this instrument, the hyperbiwa, adds internal springs for resonance and uses other non-traditional materials. [additional keywords: lute]

"Bamboo and Music; Part 1": Richard Waters. 4 pages; 8 pictures.

The author surveys some uses of bamboo in world instruments including genggong (Jew's harp), shakuhachi, musical kites, batutu, pan pipes and other wind and percussion instruments. Also included is information on harvesting, curing and working with the different types of bamboo.

"The Sub-chant Generator": Q.R. Ghazala. 7 pages; 5 pictures; 3 drawings.

Reaching back to the origins of western notation, the author takes a look at Gregorian chant and chant traditions of the world. Then he continues with descriptions of his subliminal-chant generator, which is two voice-synthesizing ICs that he rewired and organized into one sound-producing unit. Practical words on how he built his instrument end in a tantalizing list of resulting sounds. [additional keywords: circuit bending; electronics; allophones; phonemes; music history]

VOLUME 14 #3, MARCH 1999

Letters and Notes. 10 pages; 9 pictures; 21 drawings.

Dwin R. Craig: Amiga computers used for speech synthesis.

René van Peer: Musical interaction with birds. Bash the Trash: 6 ideas for simply constructed instruments using recycled materials. Notes: "Music of the streets" by Michael Colton about car-activated sounds published in The Washington Post Oct 1 1998. See www.composersforum.org for info on Harry Partch archives. Pictures and short text of Jacques Rémus' mechanical-acoustic instrument [additional keywords: midi; computers]. Information on cigar box guitars from Shane Speal. Web site list includes search engine reviews.

"Polymorphous Percussion Construction; Making Drums out of Everything in Sight": Zeno Okeanos. 6 pages; 19 pictures. The author recreates percussion instruments of the world while applying his own ideas and materials. His writing provides information and background on traditional instruments such as tumbao, quinto, palito, congas, shekeres, kettle drums, udu, berimbau, cowbells, t'ao ku, and more, and includes construction notes on his own modifications.

"The Dolceola; The World's Smallest Grand Piano": Andy Cohen. 6+ pages; 5 pictures; 1 diagram. The dolceola is a miniature acoustic keyboard instrument modeled after a piano that was produced in Toledo, OH at the beginning of the 20th century. This article is a collection of historical facts, speculation and information gleaned from the observation of still existing dolceolas, all of which are the results of the author's 25 years of researching the instrument. [additional keywords: Washington Philips; blues; key action; tuning systems]

"The New Sax Fingering System": Jim Schmidt. 3 pages; 6 pictures; 3 drawings. Using his experience in engineering and machining, the author has redesigned the fingering system for the saxophone. This new system is arranged so that each successive chromatic note lies under each successive finger. Thus, fingering and transposing are simplified and extraneous hardware is eliminated. [additional keywords: Boehm fingering system]

"Paul Panhuysen's Long String Installations": René van Peer. 8 pages; 10 pictures; 2 drawings. The author reports on the world of long string instruments that

Paul Panhuysen has developed in roughly 300 installations over more than 15 years. From interviews and his own observations, the author writes about string materials, architecture, resonators, tunings, tensions and playing techniques both human and mechanical. Some words on Panhuysen's CD "Three Partitas for Long Strings" describe the technique and results of the recording. [additional keywords: Pythagoras]

"Laudable Launeddas and Other Reedy Folk": Robin Goodfellow. 4+ pages; 14 drawings.

This article is the seventh of the author's series on instruments for children to build. She presents the interesting and comical lore of the launeddas, which is a reed instrument from the Italian island of Sardinia. Then she gives instructions on making a similar idioglot instrument out of soda straws.

"Aeolian-Bow Kites in China": Mitchell Clark. 4 pages; 2 pictures; 1 drawing.

This article presents some history and examines the language related to Chinese Aeolian-bow kites. [additional keywords: organology]

"Making a Fengqin": Wang Qinian, Wu Guanghui and Yu Jiming. Translated by Mitchell Clark and Rene Yung. 1+ pages; 4 drawings.

This is a counterpart to the above article describing how to make an Aeolian-bow to add to a kite.

"The Homemade Clements Plywood Centennial Augustus Stroh Violin": Cary Clements. 5 pages; 12 pictures; 4 drawings.

The author opens with some brief history of the Stroh violin and then guides the reader through the process of building his own copy.

"Deeper into Fleshtone; Sound Energy within the Human Body": Monte Thrasher.

This is the second article in a series that began in ExMI September 1998 Volume 14 #1. The author unveils further thoughts and inventions related to the human experience of infrasound and tactile sound or fleshtone. The author's fantasies mingle with devices such as the Bonefone, audiotac, Holophonic recording and much more. [additional keywords: sound sculpture; sirens; acoustics; patents.]

"Bamboo and Music, Part 2": Richard Waters. 4 pages; 3 pictures.

This is the second part of an article in EMI December 1998. The author looks at some different species of bamboo and their properties and uses. Then he explains various methods for preserving, curing and working with bamboo. [additional keywords: wind instruments; stamping drums; guiro]

Letters and Notes. 18 pages; 35 pictures; 5 drawings.

Shane W. Speal: B.B. King's Mailbox guitar. Hugh Davies: Experimental instruments in *The New Grove Dictionary of Musical Instruments*. Bob Grawi: Pogo stick bumbass, infra-sound, double bridge harps and thanks. Notes: Report on the San Francisco State University Sinusoidal sound exhibition in March and April 1999. David Knott, music therapist, creates a program teaching homeless youth to create their own instruments. Alberto Magnin: Building membrane kalimbas and bamboo idiophone resonators. James Harbison: A giant rain stick, the Dumpstick, made during residency at San Francisco Recycling and Transfer Station. Frank Pahl: Automated door bell instruments. Len Maurer strings his walking stick to create the versatile Musicane. Michael Bradke's interactive sound sculptures. Hans Tschiritsch, theater musician, builds instruments influenced by the Stroh, hurdy-gurdies, and more. Instruments from Hungarian maker, Viktor Lois. New instruments and coming CDs from Les Phônes. A report on Dr. Cecil Adkins' lecture and performance on 15th-18th century European instrument, the tromba marina. Richard Johnson's winslaphones combine various types of mouthpieces and bells to create different timbres. Bill Reid's steel sound sculptures. Peter Hurney describes "the cold water shower reaction device".

"Globular Horns": Barry Hall. 4 + pages; 8 pictures; 1 drawing. The author describes his discovery of a globular horn disguised as an udu, and then his development on the theme with globular drum-horns, globular-tubular horns and globular fiddle-horns. He also untangles some of the mysterious behaviors of these instruments.

"Freenotes from Richard Cooke": Bart Hopkin. 4 pages; 10 pictures; 1 drawing. This is a photo journal of Richard Cooke's percussion bar instruments with some nice pictures of great instruments and layout ideas. Notes on the instruments from Bart Hopkin.

"Journey Through Sand and Flame; A Ceramic Musical Instrument Maker": Brian Ransom. 4 pages; 12 pictures. Pictures of beautifully sculpted, ceramic wind, string and percussion instruments illustrate the ideas and developments the author writes of.

"The Photosonic Disc": Jacques Dudon. 11 pages; 28 pictures; 2 diagrams. This article documents the author's extensive work with light as a sound source. He uses rotating transparent discs patterned with opaque ink to alternately block and pass light shining through to a photo electric cell to create different timbres and pitches. He describes his methods of creating the discs and filtering and modulating the output. [additional keywords: waveforms; harmonics; tunings; Fibonacci; fractals; barabarie organ; sequencing]

"The Cultivated Sculptural": Ela Lamblin. 5 pages; 6 pictures.

The function and design of instruments made from carrots, bull kelp, bicycles and stones blends with choreography and dance in this description of the author's work. He and his spouse are working together to create a new genre of performance found in the merging of instrument building, music and dance.

"Beyond the Shaker; Experimental Instruments and the New Educational Initiatives": John Bertles. 5+ pages; 2 pictures; 4 diagrams.

Out of his work in elementary schools in New York, the author presents ideas for cross-curricular applications of instrument building in the classroom. He opens with some recent history of arts programs in schools, and what is needed to meet current requirements. Then he goes deeper into the connection of instrument building to history, cultural studies, geology, math, science, literacy and environmental studies. [additional keywords: finger piano; pan pipes; recycled materials; notation systems; acoustics]

"No Unifying Idea in the Work of No One in Particular": John Berndt. 4+ pages; 7 pictures.

The author runs through a selection of his original instruments ranging from amplified acoustic experiments to feedback and circuit bending.

"Circuit-Bending and Living Instruments of a Future": Q.R. Ghazala. 9 pages; 16 pictures; 1 drawing.

The author's final article for ExMI is a guide for the beginning circuit bender wishing to discover worlds of unintended sounds in toys and other simple sound-making circuitry. He covers all the tools, supplies and techniques one needs to embark on this adventure, and includes illustrative examples of his own instruments. [additional keywords: switches; potentiometers; capacitors; photo resistors; solar cells; LEDs; humidity sensors; body contacts; line outputs]

"Straws in the Wind, or, the Wind in the Willows": Robin Goodfellow. 5+ pages; 32 drawings.

To complete her pedagogical series in ExMI, the author presents her pan pipes, slide whistle and oboe made from soda straws. As always, she includes interesting instrumental and cultural lore.

"Extra, Extra - Stroh Violins Still Being Made!!!": Cary Clements. 4 pages; 11 pictures.

The author reports on his research into the making, design, function and use of two contemporary Stroh spin-offs: the Burmese Stroh violin and the Transylvanian funnel fiddle.

"Articles We Shoulda Done": Bart Hopkin. 2+ pages.

These last notes from the editor of EMI include some interesting leads for continued research: novelties from the Deagan company, slide saxophone patents, John Keeley, Chinese-Western orchestral instruments, pedal steel guitar and bell harps.
