Many Happy Returns

No. 22 A Quarterly Newsletter of the U.S. Boomerang Association Spring 1985

Update on USBA Nationals

After having moved from the East Coast for the first time last summer when they were held in Delaware, Ohio, the United States Boomerang Association's national championships really are going West—all the way to Los Angeles this year. The competitions, both team and individual, along with a lot of associated activities such as the annual meeting, will be held at California State University at Northridge, a Los Angeles suburb near Burbank, from July 12-14. Jerry Caplan is tournament organizer, and is being aided by USBA members throughout his state.

The schedule for the long weekend was printed in the last issue of this newsletter, and a complete rundown of activities, competitions, social events, etc., is being mailed separately to USBA members by Caplan. If you have not received an information packet by now, or not being a USBA member want to receive one, kindly contact Jerry Caplan and he'll send one on. His address is 828 Old Farm Road, Thousand Oaks, CA, 91360. Telephone: 805/495-5389. If writing, please send him a *large* self-addressed, stamped envelope. Caplan needs to have reservations for both housing and a gala Saturday night barbecue in by May 15, so a quick response from members would be much appreciated.

Here's what you need to do between now and the nationals: practice up, perfect your tricks for the demonstration throw, get a four-man (four-person) team organized for the team fling, set aside boomerangs to trade, contact president Ali Miller (address on back cover) if you want to give a donation of a boomerang or some other germane object to be auctioned for the benefit of the USBA; and pick out the boomerang or two from your collection you want to enter in the exhibition sweepstakes. Also, get your night equipment organized for the big night throw. Make your air reservations soonest to save money. And join Jerry Caplan in a joint prayer that the infamous Santa Anna wind doesn't descend on the tournament. See you there!

What's Ahead

April 19, Friday, first annual University of California at San Francisco Tournament on Polo Fields in Golden Gate Park. Contact Cindy Easton, 1439 35th Ave., San Francisco, CA 94122.

May 3, Friday, to *May 11,* Saturday, demonstrations by Barney and Ben Ruhe and Eric Darnell at Memphis-in-May celebration, Memphis, TN. Phone Ben Ruhe for information: 202/234-9208.

May 18, Saturday, third annual Yale University lecture, workshop, and fling. Phone Janet Sweeting at Peabody Museum: 203/436-1710.

May 25, Saturday, spring throw at Quechee, VT, polo field, 11 a.m. to dark (strong winds are expected so "bring your best to face the worst," advises tournament organizer Eric Darnell: 802/765-4066).

June—annual Portland, OR, tournament sponsored by Marjorie Gerrish: 503/292-5697.

June 15, Saturday, annual boomerang workshop conducted by Professor Duwayne Hatchett at Buffalo Museum of Science. Phone Frank Bajer: 716/896-5200.

June 21-22, Friday and Saturday, annual demonstrations and tournament at Buffalo Science Museum (as above).

July 12-14, Friday through Sunday, annual United States Boomerang Association national championships, both team and individual, at California State University at Northridge (see story on this page for details).

Note: Many other workshops and tournaments will be held over the course of the spring and summer, including matches in Amherst, MA, phone Larry Ruhf at 413/536-5474; Delaware, OH, Chet Snouffer 614/363-4414; Long Island, Holly English-Payne 516/627-1389; Washington, D.C., Chuck Bernstein and Dennis Lewis, 202/968-4230; Pittsburgh, Ray Rieser 412/335-5216; Texas, contact Hugh Vandergrift, 2308 Zinnia Court, Killeen, TX 76542; Hendersonville, TN, Rusty Harding

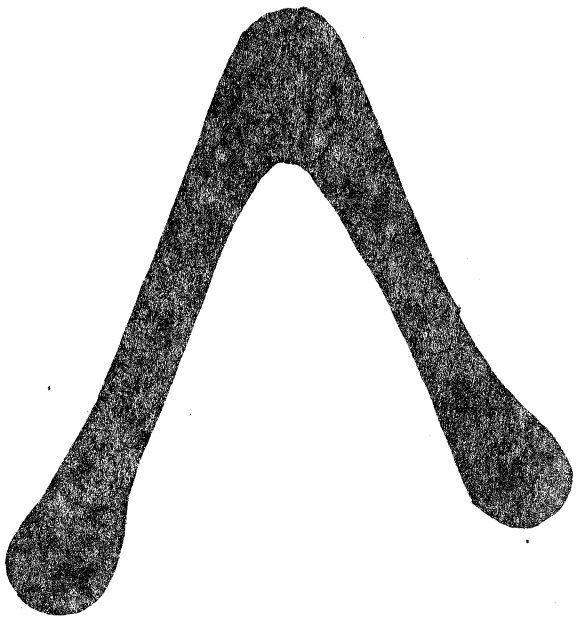
What's Ahead (continued . . .)

615/449-5694; Germantown, KY, contact Mark Morgan, Rt. 1, Box 96-C, Dover, KY, 41034; Eugene, OR, phone Kites and Other Delights shop at 503/344-5483; Ogallala, NE, Vicki Todd, 513 W. J, Apt. 4, Ogallala, NE 69153; University of Illinois, Paul Sprague, 1101 Florimond, Elgin, IL 60120; Providence, RI, Andy Shaindlin, Box 5143, Brown University, Providence, RI 02912; Burlington, VT, Larry Gorkun, 302 Davis Hall, University of Vermont, Burlington, VT, 05405; Atlanta, Dr. Brent Russell, 404/636-6500; San Diego, Dan Russell 619/296-4243; Morgantown, WV, Dean Helfer 304/296-1876, etc.

Just In: June 1, Saturday, Hampton, VA. Contact Ray Laurent, (804) 872-7095, evenings, and Dennis Joyce at (804) 595-4679, days.

USBA Nominees

Ted Bailey, the nominating chairman, has announced the slate of officers to be voted on during the annual meeting of the USBA in Los Angeles on July 13. There is only one candidate for each of the top four offices, as follows: president-Chet Snouffer; vice president-Larry Ruhf; secretary-Ted Bailey; treasurer-Ray Rieser. Other candidates nominated by the Dec. 31, 1984 deadline have dropped out of the running, for a variety of reasons. Three members of the board of directors will be chosen from the following slate: Eric Darnell, Dave Emler, Carmen Foster, Shelley Mack, Ben Ruhe, Larry Ruhf, Chet Snouffer, Hugh Vandergrift, and Bob Venable. Bailey notes that nominations for any of the above offices will be accepted from the floor during the annual meeting.

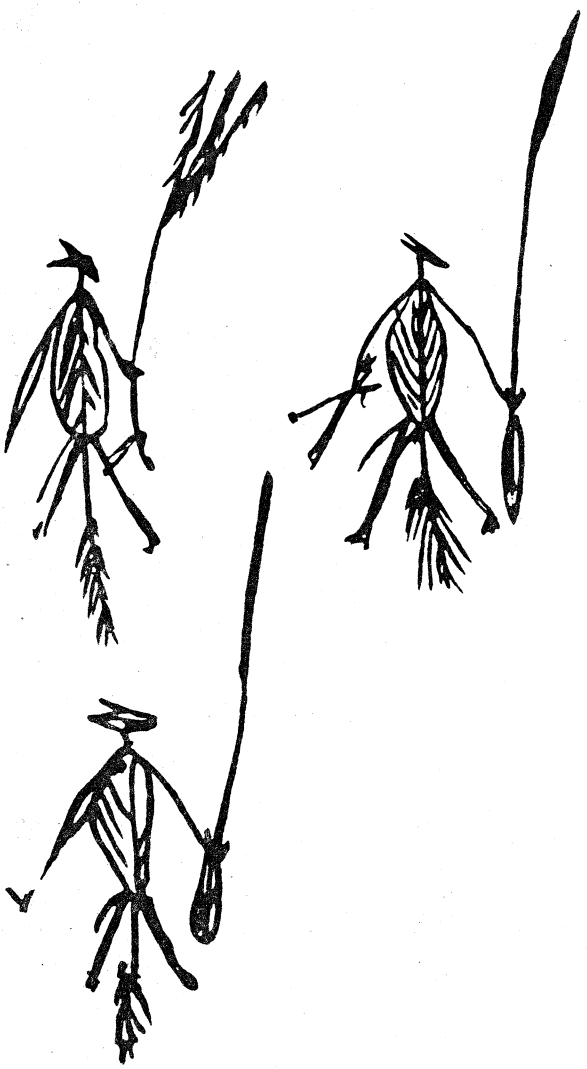


Throwing Backwards

Dennis Joyce of Newport News, VA, has perfected a backwards, over-the-shoulder throw which brings him accurate returns. He's gotten so good with it he can even juggle two boomerangs this way; throwing them consecutively, he keeps one in the air at all times while making catch after catch. How does he manage this odd throw? Pay attention. "Let the boomerang hang down from your fingers, curved side toward the palm," he advises. "Lean it away from your head if throwing a right-hander right-handed, or vice versa. However, you can toss a leftie with your right hand (and of course vice versa); in this case, lean the 'rang away from your head." Got all that? "Now," he says, "release with a snap of the wrist, a *really* strong snap. Then after you get the throw down pat, try combining it with behind-the-back catches for a total effect." Chet Snouffer of Delaware, OH, watched and learned and has some useful comments on his own experience with this unusual toss: "Start out with a Wham-O-Rang or other multibladed boomerang which is easy to throw and tough, since your early efforts may miscue; save your prize two-bladers for after you have gotten the knack. Don't think too much about throwing over the shoulder, or you'll do badly. Just relax and snap that baby with abandon. Also, make sure the wind is from the proper angle, i.e. 180 degrees away from the normal direction." Chet concludes: "If you find your normal type of boomerang doesn't produce good results, switch to a leftie if your are right-handed, or a rightie if you are a southpaw. Might make all the difference. And remember, nothing worth doing comes easily." Give it a go, mates!

Tournament Grants Offered

With the Wham-O Corporation deciding not to make boomerang competition grants as announced, the United States Boomerang Association has stepped in and with this notice announces its own award program. If you want to hold your own small tournament, the USBA will send on request a packet of rules, suggestions on how to organize the thrcw, other information, and a $50 award for basic expenses, to be spent as the sponsor sees fit, say on a poster or for prizes. It is expected that the application will come from an established club and will use USBA rules (although competitions other than those outlined in the USBA tournament booklet can of course be invented). If interested, apply *immediately* to Ali Fujino Miller, USBA, 3009 137th St., N.E., Bellevue, WA 98005, giving a brief outline of what you plan.



News From Australia

Considering the arcane terminology used to describe boomerang wings (dingle arm, lifting arm, leading arm, trailing arm, etc.), Aboriginal Joe Skeen of Brisbane has come up with some straightforward, easy-to-grasp terminology. Starting from the standard Aboriginal view that there is only one correct way to launch a 'rang, viz., with the V of the boomerang pointed backward over the shoulder, Skeen simply dubs one arm of the boomerang the "handle" wing, the other the "aiming" wing. Good clear thinking. Dingle arm indeed! . . . For those who never saw him in action, it will seem incredible that Les Janetski of North Albury—now 84 years old—recently won first place in the Accuracy competition in the Cobram-Barooga Boomerang Club throw. This in a high wind that separated the experts from the amateurs. Keto Tetsundo, who is clearly not one of your typical Outback good old boys, took two events, including Fast Catch. And Arthur Janetski, Les' kid brother at age 81, took second in the demanding Australian Round. Good on all three, especially considering the hot entry list, including four members of the 1984 Aussie national team . . . Expatriate American Chris Henzgen has gone the whole hog for Australia. He has issued a fingering chart for the didgereedoo, the Aboriginal drone pipe of which he is an expert player ("This must rank as the all-time impractical publication," he comments), and has established a boomerang museum on St. George's Road in North Fitzroy on behalf of the Victorian Boomerang Throwing Association . . . Brother Brian Thomas is spreading the boomerang word in Italy these days. He has been posted to Rome by the Christian Brothers, of which order he is a member, and will doubtless attempt to convert the Pope to the joys of the sport, meanwhile amusing himself by chucking 'rangs around every eternal city monument of note . . . Dr. Peter Jonson has retired as editor of the Boomerang Association of Australia's fine bulletin and is to be commended highly on his expansion of it, long interviews with boomerang luminaries around the globe being a feature. In the context of a Sydney Morning Telegraph article on what was described as "warring" French boomerang federations, he notes the comment that there is more boomerang throwing in Paris' Bois de Boulogne than in Sydney's Centennial Park; then he goes on to add a personal note of his own: "This is not, of course, surprising, as boomerang throwing is apparently banned in Centennial Park. The editor was once asked to desist by four (yes four!) mounted policemen. 'Throwing missiles is not allowed,' the sergeant explained. 'This isn't a missile,' the editor replied, 'just a highly tuned sporting boomerang.' 'You may have a point, sir,' replied the copper. 'If you'd like to test the issue in the courts, we'd be happy to arrest you.' Discretion seemed the better part of valour." . . . Sam Blight reports from Western Australia that he has scouted out excellent sites for proposed major boomerang competitions in Perth, which is just now getting into the swing of boomerang-throwing. "Perth is really excellent (and of course I'm completely unbiased!) due to her reliable weather, abundance of recreational facilities and increasingly high profile from the forthcoming America's Cup yacht races. I have found a few sites that are eminently suitable in terms of their size, availability, and protectedness from the wind, which is the only real impediment we have here."

Book Review

For those of you who bought a copy of Jacques Thomas' smashing new book and were delighted by the copious, wonderful illustrations but baffled by the French text, Cheslye Larson herewith offers some apt comment. Fluent in French after living seven years in French-speaking communites, she brings to the book review task both expertise in the manufacture of boomerangs learned from her husband Eric Darnell, and practical knowledge in throwing, learned in the fields of their South Strafford, Vermont, home.

by Cheslye Larson

Magie du boomerang (Boomerang Magic) by Jacques Thomas

Has more information than you can shake a stick at. Some highlights:

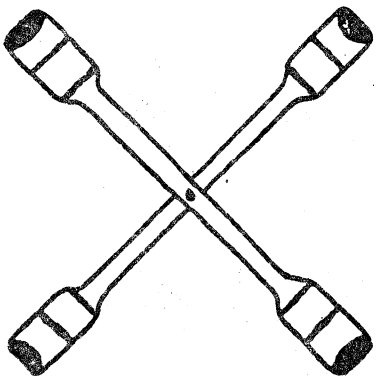
- A good analysis of different wind conditions and how to throw successfully in each of them ("aerology," he calls it).
- A good section on eliminating common errors in throwing style.
- A thoughtful treatment of the origins of the use of killer-sticks and boomerangs. He explores the contemporary practice in the Basque region of dove-hunting with nets and white-washed (non-returning) paddles flung from platforms—analogous to Aborigine methods of netting birds over swamps with returning boomerangs. He also notes some of the uses of killer-sticks, including the ritual deflowering of young virgins in some tribes in Australia.
- A discussion of the merits of throwing dingle arm vs. lead wing. Unfortunately, it can only be applied to the classic shape boomerang (Eric's comment).
- An exhaustive analysis of the physics of a boomerang's flight (58 pages), illustrated with clear diagrams.
- Names and addresses of national boomerang associations—12, including one from Nigeria.
- An extensive bibliography, including various boomerang association's newsletters.
- Nice photos of the Janetzki brothers, Jeff Lewry and Bob Burwell, among others.

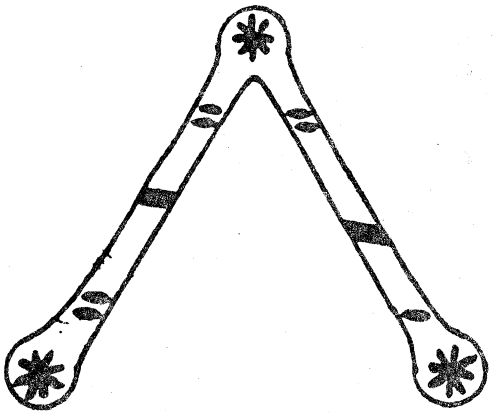
Thomas muses on why the sport is not more widespread and concludes that 1) the Australians haven't been energetic in promoting it and that 2) it is hard to mass-produce good boomerangs. He laments that unscrupulous manufacturers have brought disappointment to many aspiring throwers. He points out how one can recognize a bogus boomerang and provides a reduced plan for making your own.

He does get across something of the thrill of throwing: "Throwing a boomerang which flies far and catching it in your hands without having to move is one of the most perfect sensations one can experience." However, every aspect of the behavior of the boomerang is so thoroughly categorized and analyzed that the magic somehow takes a back seat. (I found the style a bit pedantic and had to chuckle at the academic tone—in all seriousness, for instance, he gives instructions illustrated with 3 diagrams on how to comb a terrain in search of a lost boomerang!)

A couple of misconceptions as far as I can tell: There are no more active Aborigine throwers. And as a safety precaution one shouldn't attempt to catch a boomerang that is coming in at a level lower than your face.

The one disturbing thing in this book to me, a woman, is Thomas' opinion that women are physiologically unsuited for this throwing sport, (although he gives us credit for trying extra hard). He should witness the arms on the Strafford women's softball team! It's beyond me why he chooses to discourage a large number of people from sharing the boomerang magic.





Letter from the President

by Ali Fujino Miller

As my second and final term as president of the United States Boomerang Association draws to a close, I'd like to take a backward glance over the past two years. There were many struggles for me and the USBA and a few heartbreaks, but mostly it was a time of accomplishment, and—naturally—that's what I want to dwell on. To review the record just a bit, the USBA—

- Obtained legal status as a nonprofit organization, enabling it to benefit from tax-deductible gifts. This status is difficult to obtain and is highly important for the future of the USBA. Thanks to our counsel Shelley Geballe for her excellent work!

- Organized the second Aussie-U.S. test series, won of course by the plucky visitors from Down Under to even the series at one-all. The key part of the organizing effort was fund-raising and the fact that the USBA was able to pull the project off was a near miracle. Thanks go to dozens, even hundreds, of people for all their help with the whole fine test series. Now it's on to Australia either next year or in 1988, Australia's Bicentennial, to win the Lands' End Cup back!

- Grew rapidly, approximately doubling its membership. This partly reflects the maturation of the USBA as an authentic national organization in fact rather than title. By holding the nationals in Ohio last year and scheduling them in Los Angeles this coming summer, the USBA has broadened its base immeasurably. Atlanta, by the way, has already put in for the 1986 event. USBA sponsorship of local and regional matches has been another important broadening effort and will continue to be the basis for USBA development. As has its extensive media promotion of the sport and creation of a nifty logohead to give stationery and other related material a high profile. Standards of professional organization were established for the USBA. And even a grant program established (see separate article in this issue) to foster national competitions. Extending all this has been the creation of USBA ties with corporations interested in the boomerang, such as Wham-O, to help evolve standards of safety and excellence, as well as the beginnings of links to other national federations, such as the fast-growing Boomerang Association of Australia, with a view toward codifying international rules and fostering the sport internationally.

- Established an archives of books, scholarly monographs, magazine articles, press clips, videocassettes, and films on the sport so the USBA will have a memory and archive service.

- Kept solvent as an organization. Important point! Helping out here were various contributors as well as the creation of sales items, such as education packets, John Mauro's book on boomerangs written for the benefit of the USBA, membership patch and bag to put it on, etc.

- And finally, established an active publications program, possibly the most important single activity for an organization as far-flung as the USBA. Since many members across the country cannot attend tournaments, and in fact may never have met another USBA member, the written word links them for both fraternity and the exchange of information. During my two years, the USBA issued a membership directory, put out a source sheet for wood supplies, issued a badly needed volume of competition rules, and vastly expanded the newsletter you are reading, having it typeset for the first time and adding photographs, again for the first time.

I'm sure I've forgotten things to mention, but the point is we as an organization *did* achieve greatly over the past two years. My special thanks go to a wonderful support staff, and in particular to John Mauro, without whose inspiration and hard, practical work many, even most, of the above accomplishments could not have been achieved. I wish the new USBA president and the other officers the best of luck (and fun) in the coming year. July marks the conclusion of my term of office and I hereby invite everyone to come to Los Angeles to the party. May the USBA always have many happy returns!

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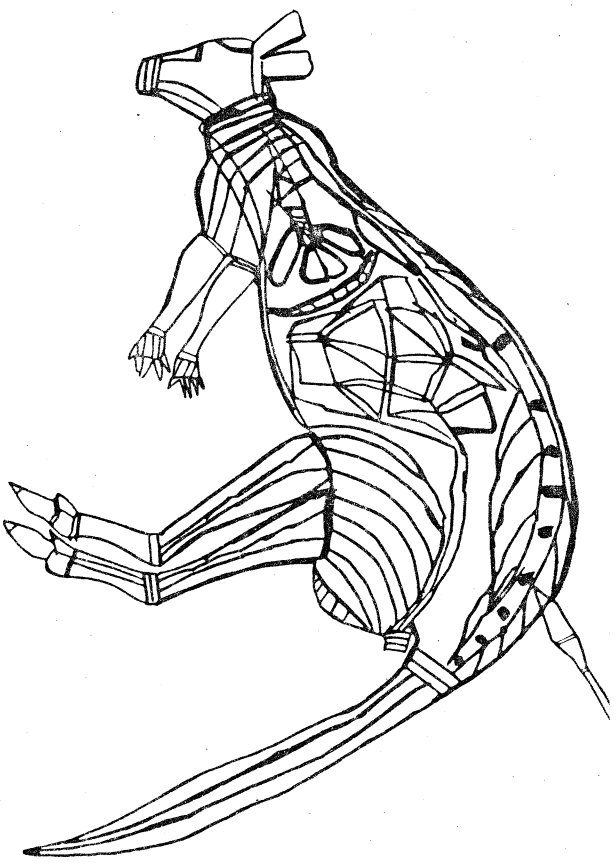
PLEASE NOTE: Effective June 1, 1985, the USBA will have a new address:

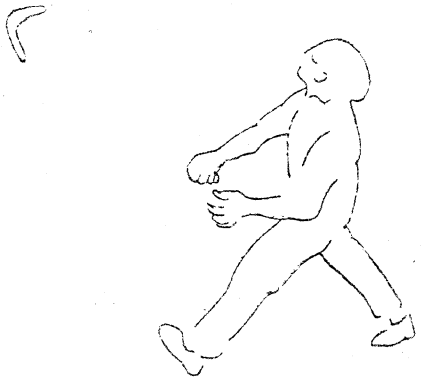
P.O. BOX 2146
LOWER BURRELL, PA 15068

Ray Rieser will handle all memberships, mailings, and correspondence as John Mauro has done.



What's Doing in Europe

Teams from the U.S., Australia and Europe will compete and give demonstrations in a "Tour de Boomerang" in France June 23-July 10. The sponsor is Vitesse, a Paris-based sports organization. Jacques Beslot of Saumur, one of his country's top throwers, is serving as technical advisor; Beslot wil be among European team members. Another will be Dave Schummy of London, the strong-armed British teenager. The American squad for the all-expenses paid jaunt consists of Barney Ruhe, Chet Snouffer, Eric Darnell, and Peter Ruhf, with Ben Ruhe serving as captain-liaison. As projected by Vitesse, the tour will include a demonstration before 6,000 people in Paris, a filmmaking sojourn to Deauville on the Channel Coast, and demonstrations and competitions in Biarritz on the Atlantic Coast, and no less than eight Riviera resorts. A one-day flying visit to Geneva, Switzerland, is also planned. It will be a busy two weeks, in short. The competitions will decide the International Masters Trophy and 15,000 francs in prize money is to be divided by the top team and top individual thrower . . . After a delay of five years because of lack of funds, the Australian Institute of Aboriginal Studies in Canberra is translating Viennese anthropologist Hanns Peter's major study on boomerangs "Wesun und Bedeutung des Bumerangs" from German into English, preparatory to having it published. "Because of it's considerable interest to scholars and particularly to Aboriginal people," the institute told Dr. Peter, "we are looking forward to making the report available to a wide public." Peter studied more than 7,000 boomerangs, most of them killer-sticks, and interviewed dozens of Aboriginals during a two-year sojourn in Australia doing research. He measured 'rangs in European museums as well . . . The Algemene Boemerang Organisatie of Amstelveen, Holland, has scheduled its sixth annual international Witsun corroborree May 25-27. Information on this delightful event is available from Max Hoeben at Rembrandtweg 197, 1181 GH Amstelveen . . .



Former world distance champ Herb Smith of Sussex, England, reports that he does a fair amount of throwing with lightweight distance boomerangs and routinely gets more than 100 meters in distance, with accurate returns. "Just in case you think I am getting soft in my old age," he says, "I practice with a large, 14-ounce boomerang when weather conditions permit." . . . Treecraft Woodwork in Dornock, Scotland, will display a loan exhibition of 19th century boomerangs from the Perth Museum in Scotland from June through September. This complements the permanent collection of modern-day boomerangs shown by this boomerang manufacturer, maker of the famous Bakwoods laminates. "We get holidaymakers from around the world touring our shop," says Adrian Green. "Most visitors are surprised that anyone makes 'rangs , let alone in the Highlands of Scotland." . . . Raymond Libeert has organized a small boomerang-throwing club as an adjunct to his yacht club in Nieiuport, Belgium. Details from him at Maria Loop Steenweg, 8860 Neulebeke 34 815, Belgium . . . Tony Slater, one of England's premier throwers, reports a personal best MTA time of 57 seconds. Excellent going! . . . The inventive, even irrepressible, Mick Hanson of Ayrshire, Scotland, proposes something he calls a "subaquaboomerang." "Firstly," he says, "it's got to be denser than water. Meanwhile, it's got to rotate for quite some time. So how about one of aluminum or sheet steel shaped as necessary with perhaps some lead added to the tips? Next find an empty swimming pool. Take a deep breath, and in you go at the deep end. Steady now, you don't want to create turbulence. Line yourself up, get ready . . . hurl. Oh it goes—wow! It's ever so slow, spins at about 1 revolution per second. Don't get too high. Don't break the surface. Nicely does it. That's ok. Time for a breath of air and down again for an ever-so-clever, upside-down catch with the feet." Friend John Jordan adds a postscript: "You do have funny dreams, Michael. And I'm still trying to think what you'd call the throw—TTW, do you think, for time till waterlogged?" . . . Switzerland has joined the ranks of European countries with boomerang organizations. The Swiss Boomerang Club was organized late last year by Nguyen Anh Kim and is centered in Greifensee, a town near Zurich. Kim says his nucleus, many of them boy scouts, meets twice a week to make boomerangs and throw them. Aided by Gunter Veit, who organized the German federation, he and his group are busy gathering an archives of boomerang information and plan a formal chartered organization. "We have caught 'boomerang fever,'" reports Kim.

Wingtip

Inventor Eric Darnell of South Strafford, VT, has come up with a way to combat high winds. He fashions "drag flaps" of steel tape, folded and stuck to the upper wing surface on one or both arms of the boomerang. They are adjustable, so they can be raised and lowered to suit wind conditions. The concept is particularly applicable to the Accuracy and Fast-Catch competitions. The boomerang requires a strong toss, but then loses spin on the return for accurate comebacks-ideal! The drawing makes everything clear:

Cross Section Through Wingtip and Flap

Limerick *by H. L. Mayhew*

A paean of praise to Felix Hess whose scientific research resulted in formulae explaining the aerodynamics of boomerangs.

A boomerang orbits a spherical
Perimeter track. But no miracle
Compares to F. Hess
Untangling the mess
With amazing deductions empirical.

Floppy Boomerang

David Schummy, the teen-age Londoner with the super powerful arm, has come up with an improbable design—a boomerang that folds up for easy carrying. It is more of a curiosity than anything else, but for those craftsmen who want to have a go at any new idea, here are David's instructions (excerpted from the British Boomerang Society newsletter):

1. Construct a regular boomerang using 6mm birch plywood. (This can be any shape although I prefer the traditional M17-type model.) Shape and test this boomerang until it meets your requirements.

2. Divide the boomerang into four equal parts.

3. Cut along the divisions and sand the edges until they are straight and smooth.

4. Mark the positions for the hinges (1'' brass). Note: *Don't* use rising hinges!

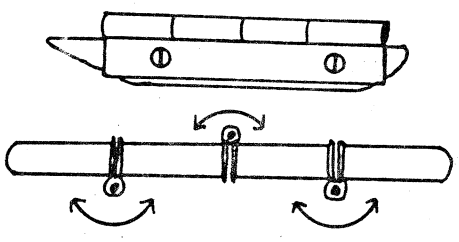
5. Screw on the hinges as shown.

6. Apply varnish or oil. (I use teak oil which gives a suitable finish but does not add much weight.)

You now have a boomerang which gives a good performance *and* fits in your pocket!

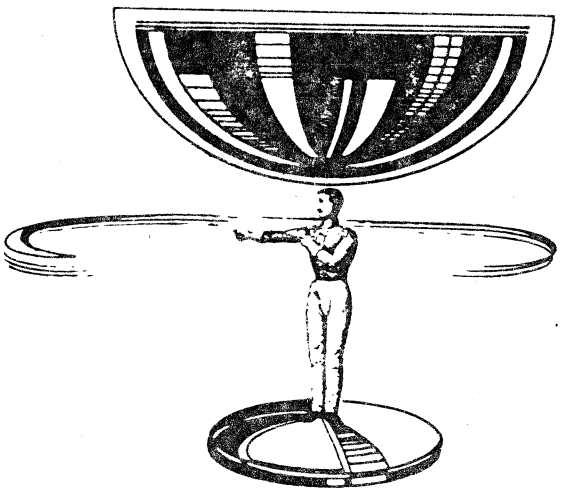
I have not tried fitting the outer hinges so that the wingtips are able to fold upwards, as I think the lift might overcome the centrifugal force holding the boomerang rigid.

If you have some difficulty when attempting to throw the floppy boomerang, just think of it as a rigid object. To obtain this 'feel', hold the boomerang as if going to throw it and swing it round. You will feel the rigidity.



Flight School

Again this issue, former aerospace engineer Rusty Harding of Lebanon, TN, tackles some questions about the returning boomerang—a subject of great interest to him as a ranking boomerang manufacturer and left-handed thrower.



By Rusty Harding

Q. I've noticed that on some boomerangs, the trailing (dingle) arm is longer than the leading (lifting) arm. Since adding length adds lift to the trailing arm but most boomerangs need more lift on the leading arm, isn't this counterproductive?

A. Actually, that would be the case if the center of rotation did not also shift when the arm length is changed. However, with the shift of center of rotation, adding trailing arm length merely shifts the developed lift pattern of the rotating boomerang in the direction causing faster laydown, in effect accomplishing the same thing as would undercutting the leading arm leading edge without adding the additional length to the trailing edge. This is another good example of the unexpected effects a change in design can cause. Of course, the additional wood will add to the over-all weight but the increase in total lift developed by the large wing surface will compensate.

Q. How does one make a two-armed boomerang that can be thrown both right- and left-handed?

A. I've made a few left/right boomerangs in the past. They're tough to make and tune, and are not really sterling performers. The basic problem seems to be in getting an airfoil which works exactly the same forwards and backwards while maintaining enough lift to cause gyroscopic precession to occur. Tuning must be done in the same manner. Though it seems simple enough, it's even hard to do pinwheels unless you're blessed with enough tooling to make precise identical cuts on all edges. All bending or warping must remain symmetrical, too! In short, the results are not worth the effort.

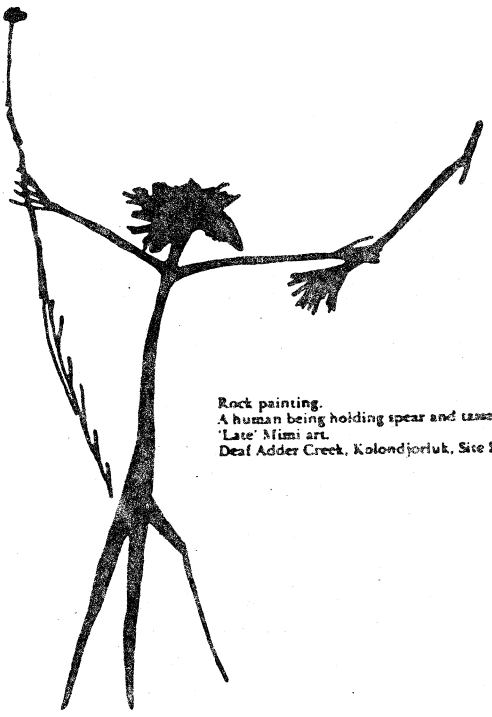
Flight School (continued . . .)

Q. I like the finish polyurethene gives but it takes so long to dry. What's the best finish to use on a boomerang?

A. You pay your money, and take your choice. I like clear acrylics for speed in finishing, clear vinyls for the way they feel and the grip they give, and clear polyurethene for toughness. Actually, though polyurethene, applied in the conventional fashion, is rather slow to dry (it dries to the touch in 4 to 10 hours, depending on weather conditions, and takes 4-7 days for complete polymerization), here's a handy hint you might try: Using a rag, apply polyurethene to the boomerang, a secton at a time if you like, though that's not necessary. Rub it in liberally. If desired, use wet or dry sandpaper while applying to take care of raised grain. While still wet, wipe off all excess with a clean rag and rub well. You'll find that you could probably then take the boomerang to the throwing field and use it almost immediately, and you'll have a durable hand-rubbed finish, too. With this method, you can use gloss, satin, or flat polyurethene with about the same results. A small bottle, carried in your bag, along with a rag, makes sealing damaged boomerangs in the field easier, too.

Q. It's advantageous to have a boomerang delay its laydown so it will cut the wind better. In carving one, how does one shape the 'rang to achieve delayed laydown?

A. Actually, the question seems aimed more at how to handle wind conditions than how to modify a boomerang. Changing a boomerang to delay laydown compromises good boomerang design. This, of course, assumes that the boomerang in question is a good one in the first place. A good boomerang is one that when thrown properly travels 360 degrees (returns to the thrower) while laying down 90 degrees (launched spinning vertically, returns spinning horizontally). A boomerang that lays down too fast will fly a figure "S" while one that does not lay down fast enough will continue circling until forward velocity is lost or until it strikes the ground. Thrown hard enough, the latter could be described as a "twice-arounder." Neither of these conditions represents good boomerang design. Laydown occurs as a result of tilting the axis about which gyroscopic precession occurs. In the practical sense, this axis tilting is a function of the differences in lift development of the leading and trailing arms (or throwing arm and dingle arm if you prefer). To decrease laydown, one merely reduces the lift of the leading arm, or increases the lift of the trailing arm, or both, until the desired effect is achieved. In doing so, however, good boomerang design is compromised. Let's look at what is required to make a boomerang more wind resistant. In order to do this, we have to know what the wind actually does to a 'rang. First, because we throw the 'rang to the right of the wind, the wind is pushing the 'rang to the right at a rate dependent upon the wind velocity. The boomerang sees this as a decrease in angle of attack, which reduces lift and turning forces. If these forces are reduced enough, the boomerang will crash, even though it is thrown properly. This can be minimized by increasing the lifting forces on the wings. Since the lift is dependent on wind velocity across each wing, adding additional spin to the boomerang will help. Throwing harder will help this condition too, but the higher velocity adds to the speed on return and is therefore not desirable. In fact, throwing softer and allowing the wind to carry the boomerang back is a more practical solution. Second, as the boomerang begins to turn, it is also laying down, allowing the wind to get under it and force the boomerang to zoom. Obviously, this is the reason for the question. The solution there is to throw the boomerang slightly higher, with slight layover so that laydown results in a vertically spinning boomerang at this point in the flight. Zooming is thus prevented. This will, however, result in a dive as the boomerang starts its return, which is why the stick needs to be launched slightly higher. Third, as the boomerang returns, it is drifting on the wind. If the 'rang is thrown softer, it will essentially "die" in front of the thrower, but because of the wind, should drift back as it dies. If all the energy keeping it flying is lost, the boom should still land near the throwing point in spite of the wind. The above assumes that the thrower uses an existing boomerang, merely working with it differently to adjust for windy conditions. A better solution is to use a boomerang specifically designed for wind. Smaller booms are less affected by wind than are large ones. Heavier booms and those which lose spin drift less on the wind. Remember, too, that a 10 mph wind will cause a drift of 14.89 feet per second on a light, hovering boomerang with no wind slippage. Even assuming a slippage of 33% (a reasonable factor for a boomerang of average weight and size), it's no wonder that a 30 second MTA flight ends up 100 yards downwind in a stiff breeze! Wind also takes its toll on range. A 30-meter boomerang will not achieve 30 meters in a 10 mph wind, so if range is important, a longer range boomerang should be selected for windy throwing.



Rock painting.
A human being holding spear and tasselled spearthrower.
'Late' Mimi art.
Deaf Adder Creek, Kolondjoriuk, Site 2.

Freestyling Fun

by Chet Snouffer

The current talk among "hot dogs" centers on getting freestyle events in tournaments. Guys like Red Whittington, Dennis Joyce, and Lee Sedgewick have continued to be innovators in the area of freestyle. At a recent fling, I spoke with Red Whittington about freestyle catches and possible formats for including exhibitions in tournaments.

Since freestyling is inherently an individualistic approach to boomerang throwing, it seems an injustice to run an event like "follow the leader," where one person makes a catch and everyone else tries to follow suit. After all, we're talking about the purely subjective strutting of one's stuff here; accentuating the strengths and diminishing the weaknesses of the thrower's individual style. Hence, Red's suggestons, as follow:

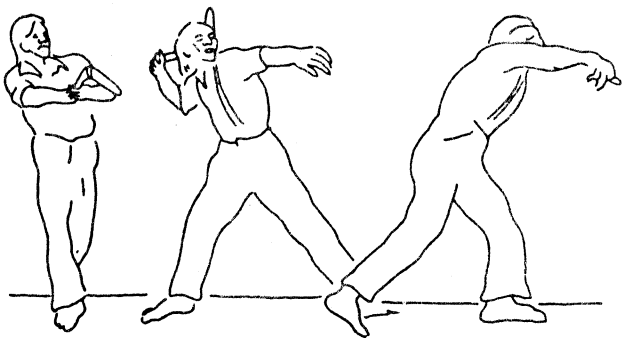
Flights of 3 to 5 throwers should take turns at a designated number of catches. The first thrower might do a twisting behind the back and the next a leaping catch in an attempt to outdo his predecessor. The idea is to throw your best stuff and get in a groove by rotating quickly with the others, always aiming at one-upmanship. Crowd reaction or judges' subjective scores can determine the "winners," although we think everyone wins when a spectacular catch is made. What a thrill! If there are 10 throwers who want in the competition, then they would be divided into flights of 3 to 5 in a group so that their throws are closely spaced, allowing them to "get hot."

Freestyling can involve trick throws, trick catches, or both. Of course, you must have a good throw in order to set up a good catch. Some throwers prefer a slowly spinning boomerang upon return, others a fast rotation in the hover. Regardless, most agree that a stable hover on descent is the key to successful catching. You've got to be able to quickly "read" the flight path and decide which catch will work best with the incoming flight path. Indecision midway through a catching attempt is how you get hurt.

OK, so how do you go about making some spectacular catches? Let the way the boomerang is coming in determine your catch. For example, a low, steady glide path is an easy under the leg snag. A stable hover dropping in at head height would make a nice behind the back, twisting halfway "in" for the catch, and half twist "out" after the grab. A boomerang coasting by at shoulder height would make a pretty overhand snag as it trails past you. Let's look at these three catches one at a time.

Under the leg—Two simple variations here are left-hand catch under the right leg and right-handed catch under the left leg. Boomerang at or just below waist level. As the boomerang comes in, you lift the leg over the 'rang and grab it as it comes under the leg. These are the simplest catches of this type.

Overhands—A horizontal hover, either stationary or coasting by at an arm's length, make for the smoothest grabs overhand. Aim for the *near*side of the "window"—that center circle formed by the rotating wings. Visualize the circular blur as a solid circle and quickly,



decisively, snatch the near side of the "circle" from the top. Palm down, fingers together, a failed catch should resemble swatting a fly out of the air as your boomerang is knocked to the ground in a display of seeming ineptitude! A sharp looking catch when you pull it off.

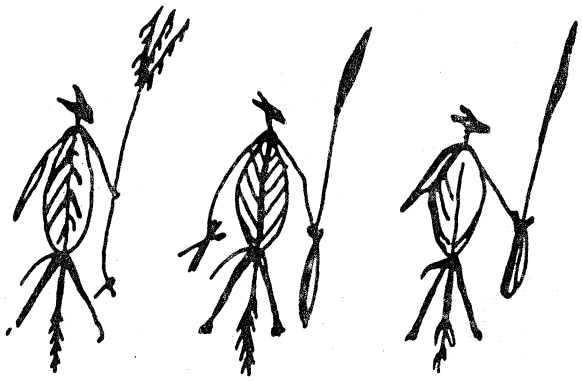
Behind back—As the boomerang comes in, a quarter turn is made towards the boomerang, with the hand laid across the lower back. Placing the hand in the same spot each time is essential to consistent catches. The palm is face up for the grab.

Now, the higher and more stable the hover, the better your chances at adding a twist or two to this catch. Start by twisting as above into the catch but instead of stopping and celebrating the moment, keep twisting after the grab to make a full twist. Looks nice!

Next you can do a 1½ twist into the catch with a half twist out (two full twists) and if you have a very high, stable hover and lots of luck, you can get 2½ twists before the catch. I've never done it, but I have seen it as performed by Red. Unbelievable!

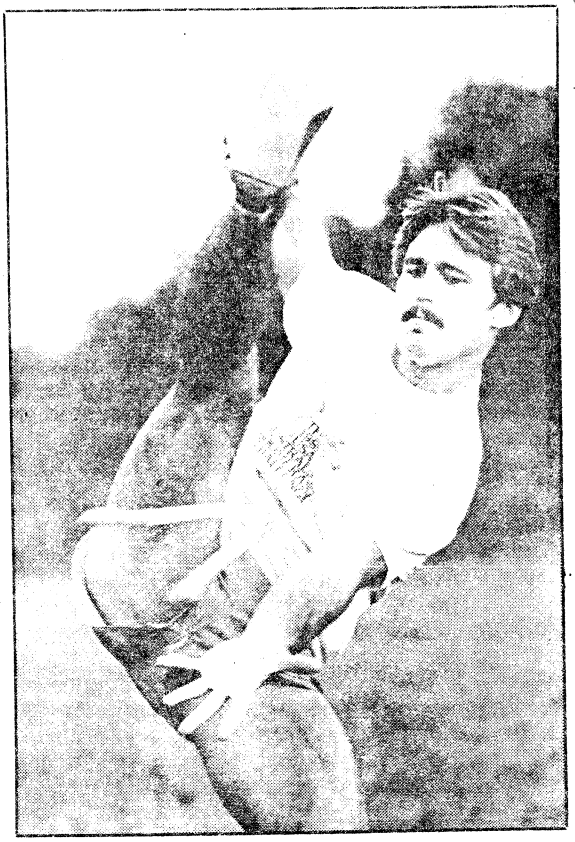
There are many other, more complex catches you can add to your repetoire, and half the fun is inventing your own leaping and twisting maneuvers. The important thing about freestyling or jamming, is to have a great time hot doggin' around. When dropping them in the bullseye bores you, liven things up with a twist . . . literally!

Excerpted from the Leading Edge Newsletter



With apple on head, Barney (William Tell) Ruhe prepares to launch . . .

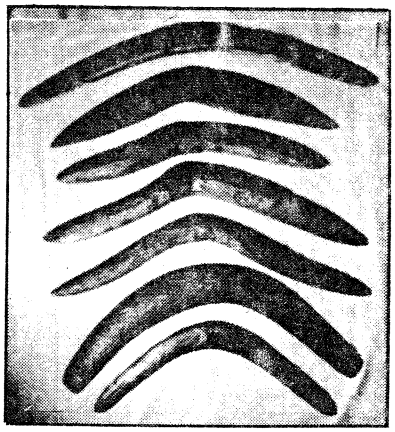
. . . and he scores a bullseye on the return.



Chet Snouffer in action.

Marjorie Gerrish, one of the long-time supporters of the sport of boomeranging.

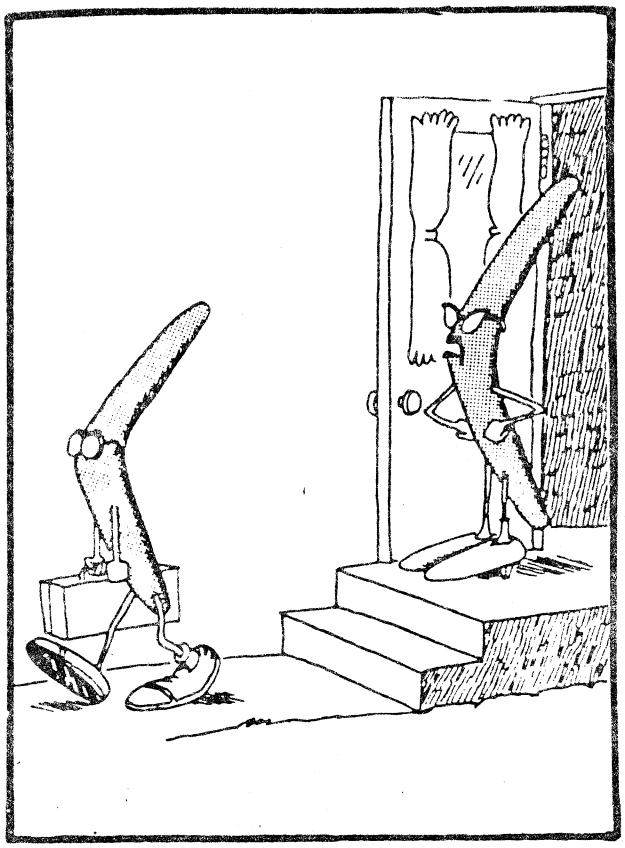
John Flynn makes a grab.



Seven of Ray Rieser's old Australian Aboriginal boomerangs, mostly nonreturn killer sticks. Some were made with stone tools. Rieser has a collection of several dozen, perhaps the best trove of its kind in the country in private hands.

The Far Side

By Gary Larson



"Ho! Just like every time, you'll get about 100 yards out before you start heading back."

Magpie Boomerang Bags

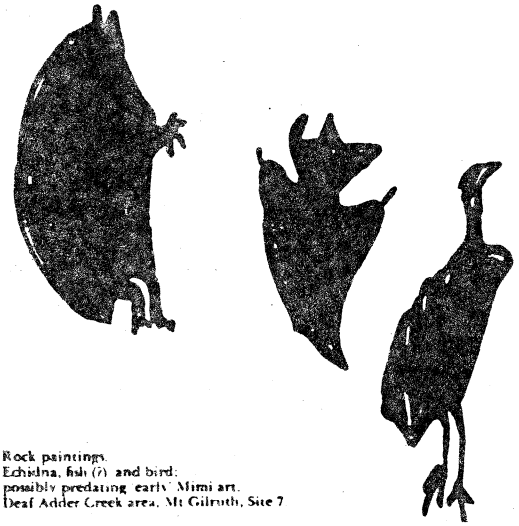
In this second installment of answers to the question-what do you carry in your boomerang bag?-three more throwers compete for a prize 'rang to be awarded the best entry in the competition. As of now, Barney Ruhe's brilliant and funny response (winter 1985 issue) is leading the pack. Contributions, anyone? (Typewritten, please.) The competition continues through 1985.

By Carl Hillier

I fly my 'rangs near Mission Bay in San Diego. The water isn't too much of a hazard, but there are a few boomerang-hungry trees. So I developed a 'rang roper to carry in my boomerang bag that makes boomerang retrieval quite easy. Select a nice-sized rock, about the size of a baseball, tie a rope around it, and tape tight with packing tape. I use a nylon rope about 25 feet long. (The length of the rope reflects the height of the trees you're dealing with.) Throwing the rock at the treed 'rang may knock it down, but if you miss and you throw high enough, the rope may catch the 'rang and pull it down. If that misses, then you've probably got the rope over a limb, and you can shake the limb by tugging on the rope until the 'rang falls. After that, just let go of the rope and the rock falls to the ground. That's the most time-saving item in my boomerang bag.

By Eric Darnell

Bandaids for weakness of the flesh; stopwatch for timing MTA and Fast-Catch and to tell me I am one-half hour late after "one more throw"; aluminum tape and change for weighting 'rangs for that extra yard or to buck a monster wind; stainless steel tape and scissors to cut it for instant repair of a broken 'rang; gymnast's chalk/rosin to catch the one that would have slipped away; warmup glove for Fast-Catch—fingers cut off and slot cut for 'rang to contact skin in palm for launch; pad and pen to swap info and addresses; 5-10 'rangs for sale, brochures, throwing instructions—for business at hand; permanent pen for signing 'rangs; polo ball for retrieving wayward, treed boomerangs; wind indicator; "Save trees" towel; 20-meter tape measure to keep Fast-Catch braggarts honest; 4-in-hand file and 80, 150, 220-grade sandpaper for final adjustments to boomerangs; kit for night throwing (syringe, tubing, lightstick, set screws, wrench), headgear for apple trick and toothpicks to hold the halved apple together; gargoyles beyond dark glasses of protection polycarbonate—lunar gray for competitions, the blended amber adds an hour to your throwing time by concentrating existing light, makes you think it's 4 p.m.; Puma shoes with semi-cleats—right at home on turf or pavement and make you forget about your feet since they don't slip; file folder with 31 slots to organize your 'rangs; competition 'rangs (lest we forget): doublers—inside small plywood V full of holes to slow it down, outsider a wide angle, natural wood elbow for hover; three distance boomerangs, aluminum dingle hooks with 78 gram, 82 gram, and 95 gram weights respectively, along with a flat board for retuning after each throw; for accuracy, a weighted Windcheater with aluminum tape, adjustable spoilers on the tops of the wings; a poly Wizard tuned for good hover for Suicide; three polypropylene Wizards and one weighted Dingle Hook for 40-Meter (Australian) Round and one weighted wood Windcheater; four MTA boomerangs, one a natural elbow, and three birch plys. All this and more fits nicely in my old Lands' End carry on bag—the only way to fly! Question: Why do I carry so much stuff? Answer: Because other throwers have come to depend on me for all of the above!



Rock paintings.
Echidna, fish (?) and bird;
possibly predating early Mimi art.
Deaf Adder Creek area, Mt Gilruth, Site 7

by Ben Ruhe

In addition to the addict's 40-50 boomerangs, including lefties for the southpaw who wanders by and lightweight spinners for the pretty girl who wants to have a throw but is all heart and no arm, I carry the usual complement of accessories, some germane, some not. A partial listing of the contents of my blue nylon Club ripstop over-the-shoulder bag with its useful interior accordion file from the stationery store might be helpful to other throwers, who might like to stock some of the things too. At the least, it will provide fruit for thought. Here goes: A small takedown windsock (from the Kite Site, 3101 M. St. NW, Washington, D.C. 20007, $3 ppd.), a foldup nylon wind and rain jacket (courtesy of Lands' End for the U.S. challenge tour of Australia—a lifesaver then and ever since), stopwatch with cord (for timing one's own five Fast-Catch performance), red kangaroo skin (for laying out boomerangs to protect them from the damp and also to elicit oohs and ahs from bystanders when they note the enormously long, unmistakable tail), Zomax tablets to ease muscle-pull pains (treasured gift of Dr. Steve Miller), several Sharpie .4mm non-porous surface marker pens (for making ratings or notes on shellacked boomerangs), powerful slingshot with steel ball ammunition (for shooting treed boomerangs out of the branches—aim for the limb and not the 'rang or you'll have a magic stick with a big dent in it!), small towels to wipe dew off 'rangs, sweat off thrower's brow (logoheads show class—mine sport "Washington Hilton Racquet Club"), stray athletic socks to wrap prize boomerangs in to protect their finish, comb (for when the TV cameramen show up late, as usual), dimes for weighting 'rang wingtips for increased range and metal tape to fasten them on, or to effect emergency field repairs on cracked or broken boomerangs, knee brace (a personal need on occasion), notebook for getting names and addresses of people you want to stay in contact with, wind gauge (gift of Rusty Harding, for confirming your worst guess about that gale you're suffering with as the crowd gets restive), etc. etc. Since boomerang throwing marks you as a big kid anyway, you might as well go the whole hog. Thus I stock a Peruvian sling to while away non-throwing time, a hacky sack, three juggling bags, even a Dominic Jalbert parafoil kite with 50-pound test line. I'd carry a Toobee if I didn't fear it would get squashed. And a little computerized chess board is mandatory.

In Memoriam

John McMahon—"Billy Boomerang"—is dead of cancer at 47. A beachcomber on South Padre Island in Texas, McMahon entertained tens of thousands of tourists over the course of two decades throwing boomerangs. He manufactured his own 'rangs, gave lessons in how to throw them, and sold them in swarms. His prowess and charming lifestyle came in for national attention when Charles Kuralt of CBS did a charming "On the Road" essay on him. In the film, McMahon, a former weightlifter, effortlessly tosses boomerangs right- and left-handed and catches both on return, throws five in quick succession and snags all of them when they came back, and performs other feats. A native New Yorker, he came to South Padre with the coast guard and stayed on after discharge to take up a kind of South Seas life. In addition to peddling boomerangs, he lived by teaching scuba diving and by manufacturing and selling shark's tooth jewelry. "He was well liked in the community," said resident Gloria Bates, "as well as by the tourists, especially the children. He'd go to the beach and put on boomerang shows. He designed boomerangs in various shapes, wanting to get a special shape for a special wind." McMahon was so widely known that his obituary was carried nationally by United Press International.

Theory and Practice

With this issue, aerospace engineer Ted Bailey of Toledo initiates his own column. The Teledynne Corp. employee, holder of two engineering degrees, will present practical and theoretical information of wide-ranging use.

by Ted Bailey

Want to design and make better boomerangs? I've found a source of literature that will help. Zenith Aviation Books has a large selection at attractive prices. Write the firm at Box 1, Osceola, WI 54020 for a free catalogue. Order direct by phoning 1-800-826-6600. Listed below are some of the titles that caught *my* eye: ***Airbrushing and Spray Painting Manual,*** $13.95; ***Flying Colors,*** $24.95; ***Polyester, Fiberglass and Information on Other Plastics,*** $6; ***Mold Design,*** $10; ***Handbook of Composites,*** a whopping 7,865 pages at $79.95; ***Theory of Wing Sections,*** 686 pages for only $9; ***Theoretical Aerodynamics,*** $7.50.

While studying an article on model airplane aerodynamics, I came upon guidelines for constructing MTA-maximum time aloft-glider airfoils. These airfoils have a similar Reynolds number to boomerangs and therefore their application to 'rangs could result in better MTA times. Note the sharp leading edge (1), the even sharper trailing edge (7); the flat spot (2) to induce turbulence to reduce the potential for flow separation (this is much simpler than dimpling the upper surface); the high point (3), which is much further to the rear than is normally found on boomerang wings; the Eppler test (4), which many 'rangs do not pass; the thinness required (5); and the mean camber line (6), to be followed if undercutting is done.

1. Leading edge radius: the radius should be as small as possible . . . 1% is nearly double the performance of the airfoil over a 3% radius.

2. Leading edge behind the point: a leading edge flat spot directly behind the l.e. radius at the 2 to 3% location improves turbulation.

3. Position of the high point: High point should be between 25% and 40% of the airfoil . . . with some improvement noted the closer to 40%.

4. The Eppler test: Airfoils should not drop off more than 5% between the 40% and 80% positions, thereby reducing trailing edge separation.

7. Trailing edge thickness: The thickness at the trailing edge should be in the neighborhood of 1% and be perfectly sharp to decrease drag.

5. Effect of thickness: The airfoil should be as thin as possible, still allowing room for adequate structural considerations, 9% appears to be the maximum.

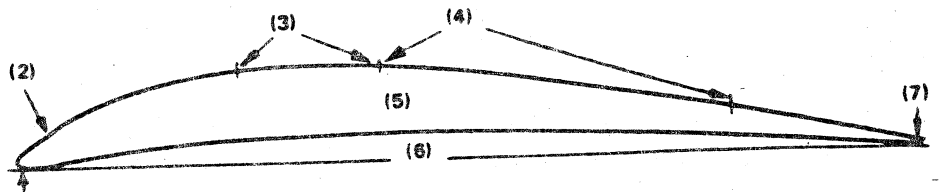
6. Undercamber: Improves duration as long as it follows the mean camber line (see illustration).

If you are interested in the full presentation, send $10 to NFFS Publications, c/o Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129.

Quotable Quotes

"Tell me a fixed rule on making a boomerang and I'll show you the boomerang on which it is not applicable." *Rusty Harding.*

"A boomerang is the poor man's falcon." *Steve Woodson.*



Using Natural Wood Elbows

The following article is by a civil engineer trained at Carnegie-Mellon University in Pittsburgh who is devoting a lot of time these days to collecting, making, and throwing boomerangs. Resident of Lower Burrell, PA, Ray Rieser here takes up the pursuit and taming of natural wood elbows. He pledges future essays on precise duplication of boomerangs, use of rubber-stamps for applying decorations and trademarks, use of spalted wood, and his analysis of maple seed pods as a means of increasing autorotation by boomerangs for better MTA performances.

By Ray Rieser

While on a recent trip to Washington, D.C., Ben Ruhe was kind enough to show me a film of an aborigine constructing a boomerang. The aborigine sought out a tree with a root coming out of the trunk at the "proper" angle. He made several cuts in the tree trunk and severed the root about 18 inches from the tree. He then pulled this boomerang shaped piece of wood from the living tree, sliced it longitudinally into two parts and shaped them into boomerangs (Figure #1).

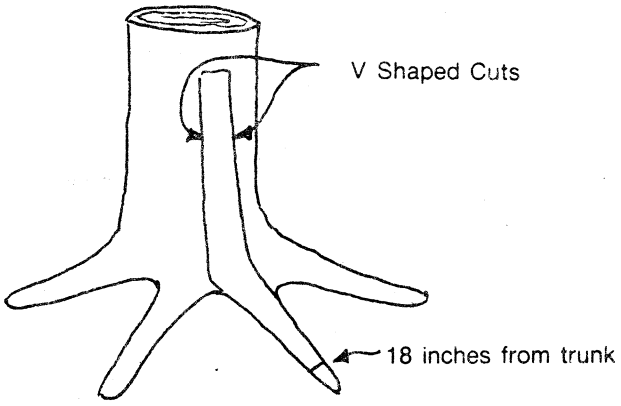


FIGURE #1

I decided that I would have to give this a try, so last fall, I set out in search of a suitable tree from which to gather my 'rang. I looked along the banks of the Allegheny River, because erosion had exposed many of the roots. Furthermore many of the trees along the river are badly twisted due to the partial loss of support of their root system. I reasoned that this would be a good potential source of natural elbows. A natural elbow develops when a limb or trunk bends abruptly, producing a shape which could be used to make a boomerang .

In searching out natural wood formations from which to construct boomerangs, several criteria must be met. It is essential that the arms of the boomerang be in the same plane and that the angle between the arms be proper (60°-110° is a good working range).

I soon discovered than even with the abundance of gnarled trees and exposed roots along the river bank, that finding a bent limb or a trunk and root combination that would meet the above criteria was rare. Rather than return home nearly empty handed, I decided that I would collect other parts of trees that even remotely resembled the boomerang shape, and slice thru them to study the orientation of the grain.

For maximum strength it is essential that the wood grain follow the shape of the boomerang. Otherwise, the 'rang may break upon impact (Figure 2).

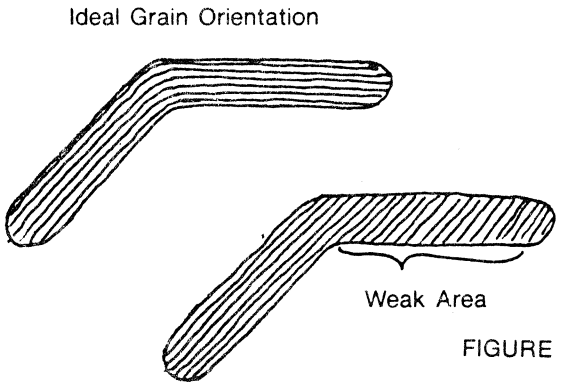
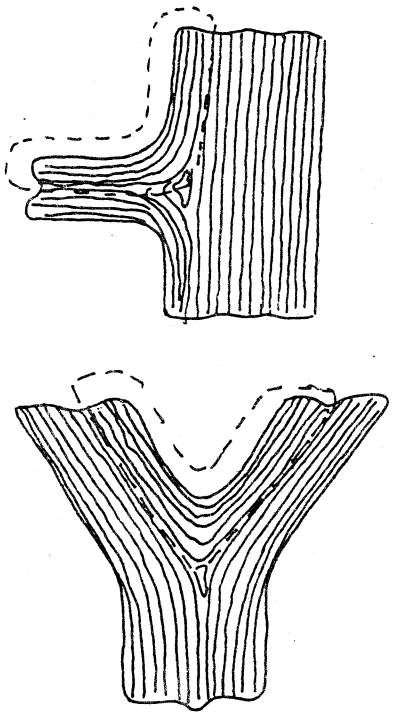


FIGURE #2

After slicing thru the various formations, I discovered that it is possible to find wood suitable for boomerang construction from a trunk-limb configuration and from a Y formation. Figure 3 illustrates the regions where the grain follows the outside contour of the tree.



Dotted Lines Enclose Regions Suitable For Boomerang Construction

FIGURE #3

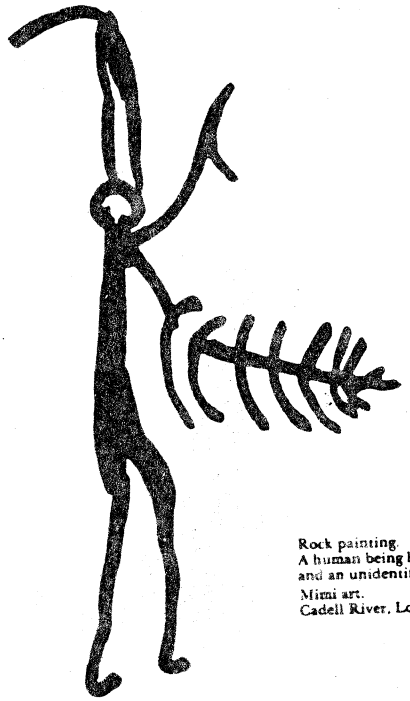
Using Natural Wood Elbows (continued . . .)

Armed with this knowlege it is possible to increase your chances many fold of finding a natural piece of wood with proper grain orientation for boomerang constructions. I found that a bow saw, sometimes referred to as a swede saw and available at all hardware stores, was the best tool to take with you to the woods. Be sure to cut your logs longer than needed, because the ends may develop shrinkage cracks. It has been my experience that hardwoods produce the nicest blanks for making boomerangs. So far I have gathered samples from cherry, locust, oak and dogwood.

Once you have brought your logs home you must take proper care of them. Wood taken from a living fallen tree contains moisture in the form of sap or rainwater, and is referred to by woodworkers as green wood. Once cut and stored out of the weather, wood begins losing moisture until it reaches equilibrium with the moisture in the surrounding air.

As wood loses moisture it begins to shrink. In a log the wood on the ends loses moisture more rapidly than the wood in the interior of the log. With the ends trying to shrink while the interior remains swollen, enormous stress develops within the log, resulting in radial cracking known as checking. To prevent rapid end drying of a log, the ends should be coated as soon as possible. Any impervious material may be used such as wax, aluminum paint, etc.

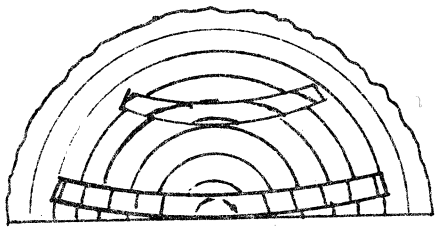
Be sure to leave the bark on the log until you are ready to slice thru it. This helps to cut down rapid moisture loss. Some woodworkers even store freshly cut logs in sealed plastic bags to slow moisture loss. I have had a birch elbow crack completely through in less than 24 hours because it was not end-coated.



Rock painting.
A human being holding two boomerangs, and an unidentified design.
Mimi art.
Cadell River, Location 8.

The easiest way to tell if a log has reached equilibrium with the moisture in the air is to periodically weigh it. When the weight becomes constant over a period of weeks, the moisture loss has stopped. This, however, can be very time consuming; for instance, to air dry a 1 inch thick piece of cherry may take from 2 to 7 months.

I for one am too impatient to wait this long. The alternative is to start slicing thru the log and see if the grain pattern is suitable. If the wood moisture content is not at equilibrium with the atmosphere the slices are going to warp (Figure 4). The easiest method is to cut your slices extra thick, stack them with shims between them to permit good air circulation (Figure 5), and let them dry. Once the wood has dried and warped, simply flatten one side with a plane, joiner or sander and then plane the other side to the desired thickness.



How Green Wood Slices Warp As They Dry

FIGURE #4

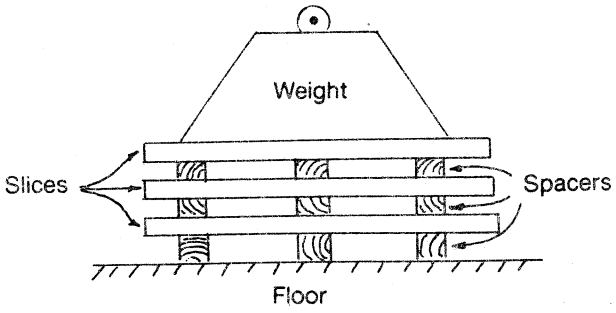


FIGURE #5

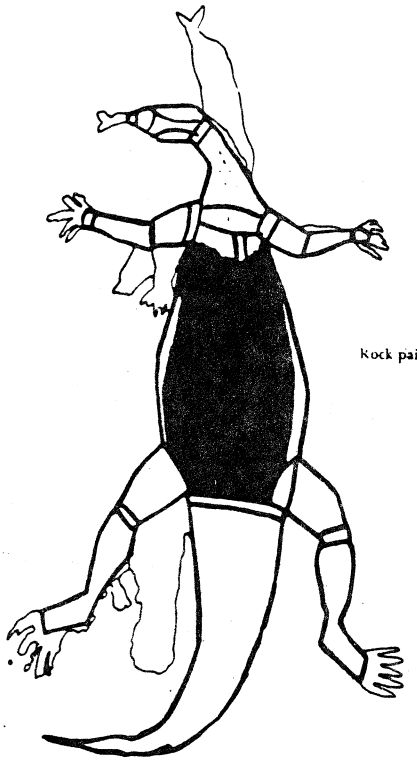
Do not cut the piece of wood to the boomerang shape until this time, because if edge cracks do develop and the slice is oversized, they can be cut away.

The process I have just described is by far the simplest method of obtaining usable blanks for boomerang construction. But with this ease comes a cost. You will find that since you must slice extra thick to allow for warpage you cannot get as many blanks from a log as you would like.

The alternative is to cut the slices the desired thickness and to soak the slices in polyethylene glycol-1000, commonly known as PEG, a wood stabilizer and chemical seasoning agent. The material is dissolved in water and the slices are treated by immersion. Following proper treatment the green wood is permanently restrained from shrinking, warping and cracking. In effect the wood is in a permanent green state.

There is a book describing the process entitled *Working Green Wood with PEG* by Patrick Spielman, published by Sterling Publishing, New York, $7.95.

I bought a 10-pound block of polyethylene glycol-1000 thru Craftsman Wood Service, 1735 West Cortland Ct., Addison, IL 60101, for $36.95. It came with complete instructions for its use.

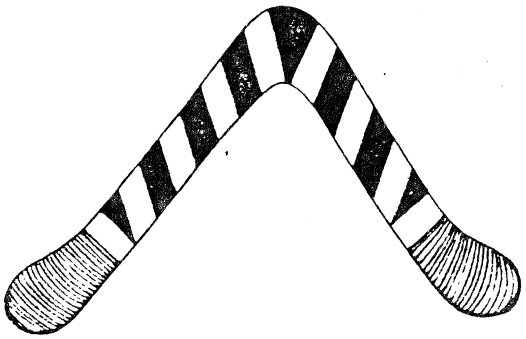


Rock painting.

The material and instructions I received came from a company called Crane Creek, Box 5553, Madison, WI 53705. It does not have a telephone listing but may send out information or a brochure on this material if you mail an inquiry.

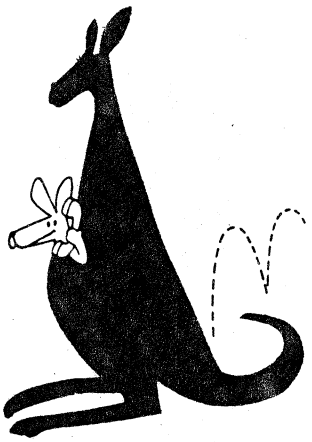
The process involves some monitoring and not all finishes are compatible with the material, so you may wish to investigate it prior to making a purchase. Watco Oil finish and moisture-cure and regular polyurethane varnishes are recommended for PEG treated wood.

The next problem you will be faced with is how to cut your slices from the log you brought home from the woods. The method you use will depend on what tools you have available.



You can cut thru the log longitudinally with a hand saw. This will produce a series of crude slices. There is a lot of labor and waste involved with this method, but you will have a minimum amount of money invested in equipment.

I currently use a radial saw for shaping the logs prior to slicing. First, I mark the centerline of grain of each cut surface and skim the log so that the center lines are on a horizontal plane. I use small wooden strips as shims and hold them in place by wrapping masking tape around the log and shim. I place the log on the saw table, raise the arm and make numerous cuts at the same elevation until the top of the log is flat and the grain is exposed.



I then examine the grain and make any adjustments necessary in the shims to produce the desired grain pattern. Figure 6 shows the marking of center lines. Figure 7 shows the placement of the log on the saw and Figure 8 shows observed grain patterns and corrective measures to be taken.

FIGURE #6

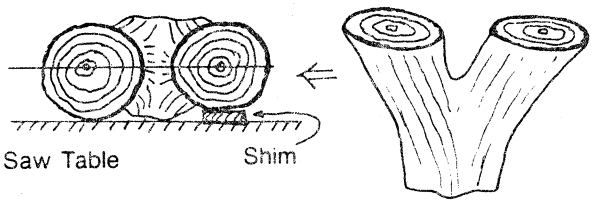


FIGURE #7

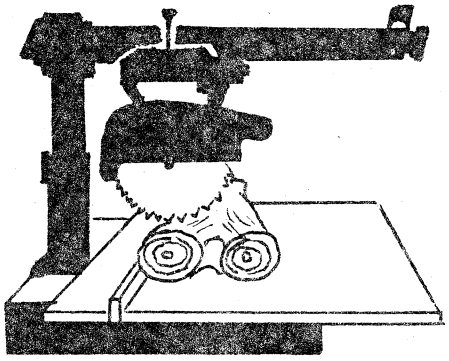


FIGURE #8

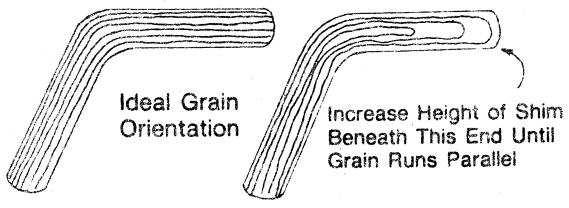
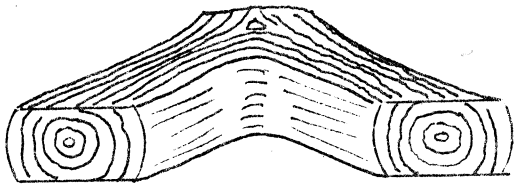


FIGURE #9



Trimmed Log Just Prior to Cutting Slices

I then turn the log over, flat side down and repeat the process outlined above. The log then looks like the one shown in Figure 9.

A few words about safety are in order here. Because of the rounded shapes that you are working with and their size, many of the standard safety features built into your power tools will be ineffective or by-passed. So *extreme* care must be exercised.

The process I described above can be performed more quickly using a dado blade or a surface planer on the radial saw. This is much more rapid and more dangerous.

Finally, I use a large band saw for cutting longitudinal slices from the log. I use a fence or straight edge clamped to the band saw table to assure uniform thickness.

If you have a joiner and decide to use it to surface your wood slices, you must be very careful because the change in grain orientation along the blank will cause the tool to chatter and try to throw the wood blank.

Dressing or smoothing the surfaces of the slices can be accomplished using a sander, joiner, power plane or router.

You can remove some of the warping that may have occurred as the wood dried by steam-bending. This method can be used both prior to dressing up the surfaces of the slices and after the boomerang has been constructed as an aid to tuning.

What you need to do is to put an inch of water in the bottom of a covered pan and bring the water to a vigorous boil. Lift the lid and insert the warped arm, or arm to be tuned, in the steam *above* the water and replace the lid. You will now be holding the other arm outside the pan. The time the arm is left in the steam varies from about 4 seconds for plywood up to 15 seconds for natural wood slices. At the end of the alotted time, remove the arm gently, bend it in the desired direction while blowing on it and the wood will be permanently reshaped.

If you find that you have not bent the arm enough or have over-bent it, just repeat until you have the desired shape. It is a good idea to practice this technique on a piece of scrap wood first. Also, keep a towel handy, so that you don't burn your hands on the hot wood.

The steam-bending will lift the grain slightly so you may have to lightly sand the piece afterwards. I learned of this process from Ted Bailey who had observed Al Gerhard's using it in his workshop for tuning his boomerangs.

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