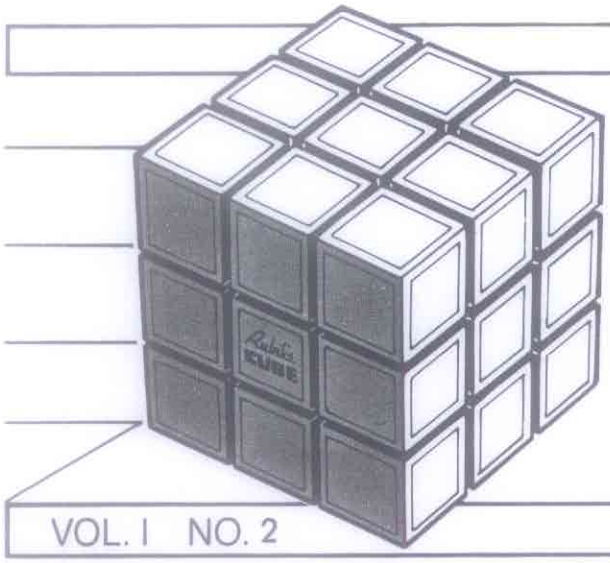


RUBIK'S CUBE

By IDEAL

NEWSLETTER

VOL. I NO. 2 AUG. 1982

★★★★★ FIRST WORLD CHAMPIONSHIPS ★★★★★

Masters of the Cube from 19 countries contended for the title in the first ever Rubik's Cube World Championships on June 5, 1982, in Budapest, Hungary. Each was a national champion selected to represent his country based on a winning time in his country's National Rubik's Cube Championships.

by Tom Parks

The setting was the magnificent Vigado Concert Hall on the banks of the River Danube in Budapest, which is one of the most beautiful buildings in Hungary, home of Erno Rubik, inventor of the incredible Cube puzzle that bears his name.

A crowd of over 600 spectators, including ambassadors and diplomats, filled the antique hall, along with batteries of television cameras and lights. NBC Sports taped the event and it will be broadcast on U.S. television in the near future.

The panel of distinguished judges presided at the event, among them Erno Rubik and Dr. David Singmaster of England.

Contestants were flown into Budapest on Thursday for the main event on Saturday. The American Embassy had a welcoming reception for all contestants and their parties.

On Friday, Hungarian officials took the contestants on a tour of beautiful Budapest. Many Cubists remarked on the high level of hospitality and courtesy shown by the Hungarians.

On that same day, a practice session was held in the Vigado. The official World Championship rules were reviewed and discussed. (See the complete rules reprinted elsewhere in this issue.)

Speed records from the 19 National Championships that led to this international event were as low as 19 seconds. So before the competition began, there were several contestants generally regarded as favorites, Minh Thai not among them.

They were Canada's Duc Trinh, 14 years old and a student, whose winning National Championship time was 26.00 seconds; France's Jerome Jean-Charles, a 26-year old journalist, 25.60 seconds; Sweden's Lars Petrus, a 21-year old student, 24.00 seconds; and West Germany's Ronald Brinkmann, 17 and a student. Brinkmann's 19-second time tied with with Finland's Jari Sandqvist, a 21-year old advertising representative, with the best national speed record of all contestants.

But the true test of the World's Fastest Cubists is an international event, a head-to-head competition with intense pressure under the watchful supervision of an international body of judges.

And though America's Minh Thai, a 16-year old high school student whose 26.06-second time won our National Championships, was not considered a favorite, he proved to be the best when the heat was on.

The competition began on Saturday. A drawing was held before the first of the three rounds of competition to determine the contestants' order of performance. Thereafter, the contestants' times in the previous round would determine the order of competition in the following round, the Cubist with the best time performing last.

Each round was preceded by a 15-second study time, half that allowed in U.S. Cube-A-Thons, though this proved no handicap to Minh Thai.

Olympic-standard digital timers were used to record times. Throughout the entire event, a high level or organization and professionalism prevailed.

At the end of Round One, Holland's Guus Razoux Schultz, 17, led with a 24.32-second time, followed by Hungary's Zoltan Labas, 26, at 24.49 seconds, and America's Minh Thai at 27.16 seconds.

In Round Two, Minh put on an amazing performance and was clocked at his winning 22.95-second time, followed in the final standings by Holland's Schultz at 24.32 and Hungary's Labas at 24.49.

Minh was utterly calm and collected throughout, even dozing briefly during the long break between Rounds Two and Three.

In the final round, no contestant posed a serious threat to Minh's leading time, and he became the first World Champion and earned the title of "World's Fastest Cubist."

★★★★★ FIRST WORLD CHAMPIONSHIPS ★★★★★

THE COMPETITORS

1. AUSTRIA	– Josef Trajber
2. BELGIUM	– Luc Van Laethem
3. BULGARIA	– Svilen Tenev
4. CANADA	– Duc Trinh
5. CZECHOSLOVAKIA	– Fridrich Jiří
6. FINLAND	– Jari Sandqvist
7. FRANCE	– Jerome Jean-Charles
8. GREAT BRITAIN	– Julian Chilvers
9. HOLLAND	– Guss Razoux Schultz
10. HUNGARY	– Zoltán Lábas
11. ITALY	– Guiseppe Romeo
12. JAPAN	– Ken'ichi Ueno
13. PERU	– Eduardo Valdivia Chacon
14. POLAND	– Sebenski Piotr
15. SWEDEN	– Lars Petrus
16. UNITED STATES	– Minh Thai
17. WEST GERMANY	– Roland Brinkmann
18. YUGOSLAVIA	– Jozsef Borsos
19. PORTUGAL	– Manel Gairinho

THE RULES

1. Each country will only be represented by ONE competitor.
2. Only one competitor will be allowed on stage at any one time to make his attempt.
3. Each competitor will be allowed THREE separate attempts.
4. All competitors will be in a separate room at the start of each round of competition, until it is his turn to make his attempt. After a competitor has made his attempt he may remain in the theatre for the remainder of that round.
5. The fastest of each competitors three times will be that which determines the winner.
6. The three recorded times WILL NOT BE ADDED together.
7. In each of the three rounds of competition the competitor will have to return a scrambled cube to a full colour formation. All six sides must show fully the six completed colours.
8. Before each competitor makes his attempt he will be allowed 15 seconds to study the cube, but he must not start his attempt during this time.
9. Immediately a competitor takes the cube from the table the official timekeeper's clock will start.
10. The clock will continue until such time as the cube is replaced on the table.
11. The clock in the centre of the display, behind the competitor, will be the only OFFICIAL time for the purposes of the Championships, and will record times to 1/100th of a second.
12. A competitor must complete his attempt within 60 seconds or he will be eliminated from competition, for purposes of that attempt only. This means that a competitor failing to complete the cube within 60 seconds in the first round, will still be eligible to compete in the second and third rounds.
13. The draw for the competitor's order of competition in the 1st round, will take place at the Forum Hotel in the Banqueting Rooms, at 2100 hours on Friday 4th June, 1982.
14. The order of competition for the 2nd round will be determined by the competitor's placings after round one. The slowest competitor after the 1st round will be the first to make his attempt in the second round, with the leader of the Championships after the 1st round making his attempt last in the 2nd round.
15. A similar method will be used for the order of competition in the 3rd round, based on the competitor placings after two completed rounds.
16. If the cube falls apart or jams, only ONE further attempt will be allowed.
17. The decision of the Jury will be final in all matters of dispute.

THE EDITOR'S CUBIE

EXCITING!

Exciting is hardly the word for it! So much is happening in the brand-new world of Rubik's Cube that we are having trouble containing all the Cube news in this eight-page quarterly.

The biggest story of all is, of course, the *World Championships*. You'll find out all about it elsewhere in this issue. Congratulations, Minh Thai, for bringing the world title home to America!

We are very happy that the long-awaited *Rubik's Revenge* has arrived on the market and is even better than anticipated. My local Cube Club had one of its most interesting meetings after the members had spent a week with the 4 x 4 Cube.

I was very happy to solve it at all and was proud of my personal record time of slightly under eight minutes. I was amazed when several club members demonstrated that they could consistently solve *Revenge* in less than three minutes. I hesitate even to guess at the potential record time for this puzzle.

The *competition format for Rubik's Revenge* is currently in the planning stage. This gives you plenty of time to become familiar with the puzzle and to prepare for competition.

Our *Second Annual Rubik's Cube-A-Thon* format is almost ready. We will again be looking for the World's Fastest Cubist and we will be holding qualifying contests in many more cities than we did last year. Watch for full details in our Fall issue.

Rubik's Cube Clinics are now in progress. Watch for them in your area. This is your opportunity to meet the Cube Champs and to see the entire line of Rubik's Puzzles in action. You will also be able to find out about future Cube-A-Thons in your area.

In addition to the contests sponsored by Ideal, many organizations, including shopping malls, charities, park and recreation departments and radio stations are hosting *Rubik's Cube Contests*.

We would like to keep our readers informed about these contests. If your organization is sponsoring a Rubik's Cube Competition, please send us information on the contest in advance, as well as the results (including photos). We will try to report on as many of these as possible in upcoming issues.

As more and more organizations sponsor Rubik's Cube competitions, we may be able to set up a "*Cubist's Tour*" in the near future. This would be similar to the present tournaments at the top levels of professional golf, tennis and bowling. You might think this sounds far-fetched, but look how far Cubing has progressed from its inception to its first World Championships, in far less than a decade.

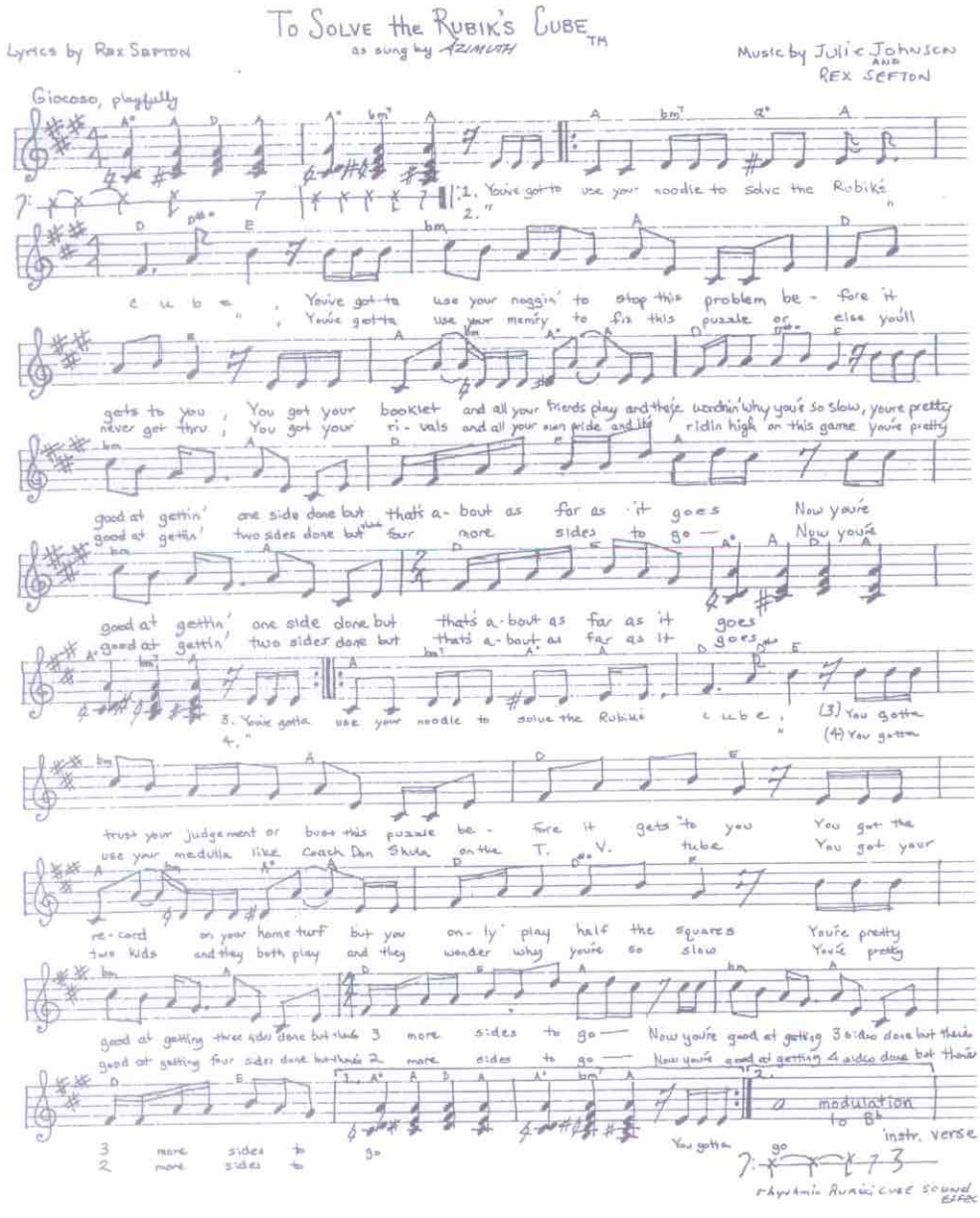
Just think, we owe all of this to a professor of architecture who devised a novel way to aid his students in understanding three-dimensional objects. Thank you so much, Dr. Rubik!

RUBIK'S CUBE WORLD TOURNAMENT

Final Times

	1st Round	2nd Round	3rd Round	Ranking		1st Round	2nd Round	3rd Round	Ranking
1. Austria	50.16	54.93	58.99	19	11. Italy	34.23	41.75	28.11	9
2. Belgium	32.92	34.98	29.73	12	12. Japan	27.56	27.90	24.91	5
3. Bulgaria	51.88	47.29	47.35	18	13. Peru	34.91	29.62	30.01	11
4. Canada	37.44	26.63	36.09	8	14. Poland	44.40	37.50	40.86	17
5. Czechoslovakia	31.49	29.11	33.20	10	15. Portugal	40.74	48.67	37.11	16
6. Finland	31.17	–	31.56	15	16. Sweden	35.42	33.11	24.57	4
7. France	27.87	31.18	25.06	6	17. U.S.A.	27.16	22.95	27.97	1
8. Great Britain	30.59	25.95	27.46	7	18. West Germany	34.80	30.59	32.32	14
9. Holland	24.32	31.51	26.15	2	19. Yugoslavia	36.75	35.33	30.02	13
10. Hungary	24.49	27.58	28.21	3					

U.S.A. 22.95 Holland 24.32 Hungary 24.49



La Salle Girl Wins Rubik's Cube™ Contest

Eleven year old Jacki Janka of La Salle, Illinois, won a *Rubik's Cube*™ contest sponsored by Spring Valley Ben Franklin Store at the Illinois Valley Music Festival. Contestants had to master the cube in less than three minutes to qualify. Joe Perona was the first runner up and Aaron Campbell came in third. Matt Wilson and Brian Tieman also qualified. They are all from Spring Valley.

Jacki won a *Rubik's Revenge*™ and a gift certificate from the sponsor. The second place winner was awarded a gift certificate and all finalists were given free subscriptions to the *Rubik's Cube*™ Club Newsletter and certificates identifying them as official Rubik's Cubists.

I, ROBBIE RUBIK

He's "Robbie Rubik" – a ROBOT who solves Rubik's Cube! The world champion "Cosmic Cubist," his computer brain figures out Cube solutions in about two-tenths of a second!

This is the story of the creation of Robbie Rubik, written by one of the engineers who participated in the project.

By Dan Talken

Every year at the University of Illinois, the Engineering campus is the site of an event known as the "Engineer Open House." Students and faculty from all areas of Engineering show off some of their projects to give the public a view of what goes on.

Tau Beta Pi is an Engineering honor society and has a chapter known as "Illinois Alpha" on the U of I campus. Each year, the organization sponsors a project for the Open House. This year's project was Robbie Rubik, a robot who solves Rubik's Cube.™

The project personnel were engineers

of three types: Mechanical, Electrical and Computer.

The computer engineers were responsible for coming up with a program that could solve any solvable Cube. The program they developed solves the Cube by the algorithm known as "Layers." That is, to start with a layer and work down the Cube. It was written in final form in machine language and run on a Northstar Horizon computer with a Z80 microprocessor.

The Cube is initially scrambled in any pattern and then the colors of each of the 54 faces are fed into the computer by typing in R, B, Y (for red, blue, yellow), etc. After the computer knows the initial configuration of the Cube, the Cube is set into the machine the same way as it is typed into the computer. Then the proper button is pushed, and the computer "knows" the solution in approximately two-tenths of a second.

After the computer knows the solution, it starts to generate the signals that go to the mechanics, which actually twist the Cube around to solve it.

The computer program for solving Rubik's Cube™ is about 8k bytes long, and if printed out on paper it is about thirty feet long. If a Cube is not solvable, the computer will respond by letting you know that there is no solution – in the same two-tenths of a second – and will not send any signals to the mechanics.

As the group's electrical engineers were responsible for building the interface between the computer and the mechanics, the mechanical engineers had to come up with the actual mechanics to actually turn the layers of the Cube.

Because we were dealing with a very limited budget, we had to do things as cheaply as possible. We built the mechanics out of wood, mainly walnut, so it does look a lot like a piece of furniture. The mechanics can only turn whatever face is "up." It does this by bringing down its turning carriage, which slips over the top layer and rotates it by using a stepping solenoid. After the top layer is rotated, the next thing to do is to get the next proper side up. This is done through the use of the 'flippers', which are just two pieces of aluminum that pop up out of the wood below the Cube and can flip the Cube in two directions. Then the 'slammers', which are air cylinders that push the Cube and put the Cube back into the holding corner, where it is ready to either be flipped again or to have the top layer rotated.

Since money was scarce, we had to use basically whatever we could get, and used solenoids out of automatic golf ball putting cups, old motors, regulators off beer kegs and stepping solenoids that can only step in one direction.

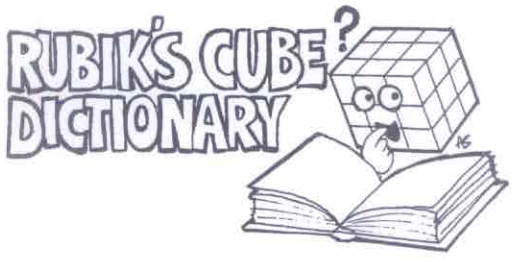
After the computer has the solution, the signals are sent, and since the average solution is about 100 moves, it takes the mechanics about six minutes to chug through and solve the Cube. It is not extremely fast, and a lot of people, mainly kids, have raced and beaten Robbie.

We have discussed it a lot, and we believe that if we were to build a Robbie II we could get a solution time of about two minutes, but it would cost quite a bit more than the first Robbie. Tau Beta Phi now owns all of Robbie, and it ended up costing about $450.

Robbie Rubik has been fairly popular. He was carried in newspapers throughout the country, was on the CBS news and the BBC, was mentioned by Paul Harvey, and had a nice write-up in Discover magazine and was mentioned in many others.

The future of Robbie is uncertain, but we are planning improvements in him. We hope to get his colorblind eyes working so he can solve a Cube at the press of a button. We also want to transfer his program to a board and install it and all power supplies inside of Robbie.

The next project now seems to be to come up with a machine to solve the 4 x 4 x 4 Cube!



CUBIST: someone who can solve the Cube without referring to a solution.

CUBE MASTER (CUBE MEISTER): 1) someone who has made a major discovery about the Cube ("It has six sides!"); 2) anyone who can solve the Cube in less than 60 seconds.

FINGER FLINGER: someone concerned only with how fast he can manipulate the Cube.

RUBIK'S CUBE BOOB: anyone who refuses to try the Cube.

RUBIK'S CUBE THUMB: pain in the thumb caused by relentless Cubing (compare "Disco Thumb").

CRASHING: losing track of your moves and finding your Cube mixed up again.

SKIDDING: turning a row too far in one direction, preventing a turn in the other direction. This is a hazard during Cube racing.

CRANKING: performing a step that mixes pieces up, and hoping they will fall into place correctly.

COSMIC CUBING: working out Cube problems in your head.

"THIS CUBE AIN'T KOSHER": comment often heard from a Cubist who discovers that one corner piece has been taken out, twisted, and replaced, giving them an insolvable Cube.

BUVOS KOCKA: the original Hungarian name for Rubik's Cube. It means "Magic Cube."

NEW PRODUCTS

WORLDWIDE RUBIK'S FUN

by Bob Weisman

There really is a world of "Puzzle Madness" from Ideal this year. Two of the new items you will be seeing this summer and fall are RUBIK'S WORLD™ Puzzle and RUBIK'S RACE™ Game.

If you've had plenty of Cube-shaped puzzle problems, I suggest you give RUBIK'S WORLD a try. It's a refreshing new challenge. It does look easy, but beware: once you get the World mixed up, you may never solve its problems! It's a little like international diplomacy – the more you delve into it, the more complex it gets.

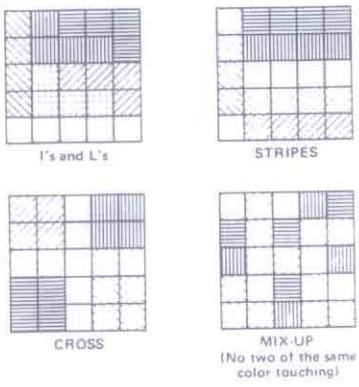
Rubik's World has the same number of moving pieces as the infamous RUBIK'S CUBE, but it presents a greater degree of difficulty for three reasons. First, its shape (a globe) makes it harder to distinguish "corner" pieces. Second, the global map adds to the visual confusion, since you must have a good knowledge of world geography. Third, the centers must be correctly rotated in relation to the other pieces surrounding them, unlike the Original Rubik's Cube.

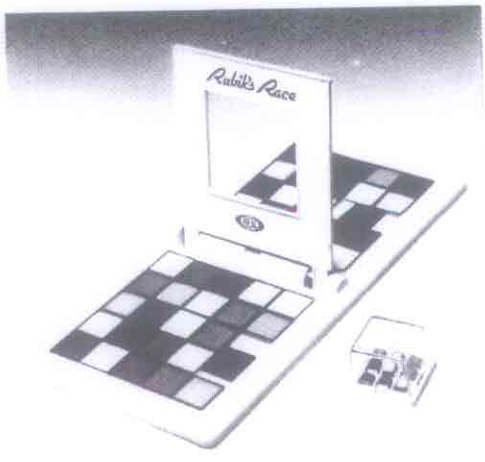
Here are two helpful hints: First, take a Cube and a grease pencil. Hold the white Cube face on top and mark arrows on all the centers pointing up toward the white face. Now do the "dot" pattern (move the center column up and the center row right, four times). Then make one 90-degree turn of the front face and undo the "dot" pattern with the inverse moves (center row left, center column down, four times) and note how the center arrows change in relation to their original directions. And since you can never rotate just one center piece, make use of the blank centers on the World's map.

On your mark!

If you like Rubik's puzzles, you'll love RUBIK'S RACE. It combines fast action, quick thinking and head-to-head competition. The game is a hybrid of the popular "15" slide puzzle and Rubik's Cube, and it uses sliding tiles in the Rubik's Colors. Each player has 24 tiles (4 each of 6 colors) and one empty space, which he furiously slides in a race to beat his opponent in duplicating a random 3 x 3 color pattern created by a "scrambler" box. The first player to correctly match the pattern slams down the frame on his side of the game base to claim the game.

You and your friends can time each other in a mini-tournament. You can even race to create specific patterns like the ones below:

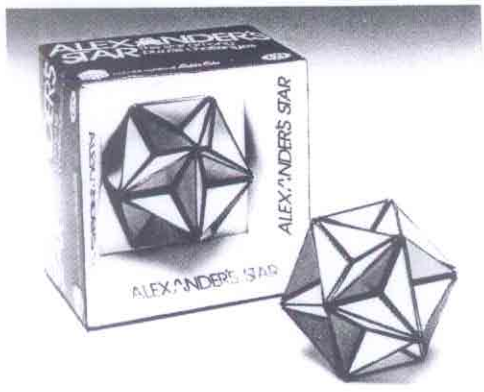




Rubik's Race can even be played solitaire, and if you choose you can swap the two sets of tiles so that you have eight tiles of each of three colors, instead of four tiles of each of six colors on each side of the game base. You can time yourself in a "Countdown" race, arranging the tiles to form the numbers from 10 down to 0, using the white tiles as blank spaces.

Any way you play, Rubik's Race is challenging fun and a great way to sharpen your skills for competition.

THE STAR AMONG PUZZLE CHALLENGES



When we at Ideal first got involved with Rubik's Cube, it seemed that it would be the only puzzle we would ever need. After solving it the first time, there was still the challenge of solving it in under a minute or in the least number of moves. Also, of course, an endless variety of patterns are possible. Rubik's Pocket Cube, Rubik's World, and Rubik's Revenge all added something new to Cubing, as did the various Rubik's Games.

However, puzzle freaks do not live by Cubes alone. When a man named Adam Alexander walked into the headquarters of Ideal Toy Corporation with a small cardboard box in his hand, and a sly grin on his face, all our hearts were beating a little faster. Adam has a reputation as a mathematician, inventor, and divergent thinker extraordinaire.

What emerged from the box was an object that looked as if it had fallen from space. It was a dodecahedron that had 12 "sides" each with five pointed stars. The points were made up of two colored triangles, and each star was part of the five stars adjoining it.

When Adam started manipulating the Star, the color movements and patterns became hypnotic. One point could travel from star to star along the puzzle, but each twist moved four other points with it. As we took turns trying to restore the 12 "sides", we realized that a new star among puzzle challenges had been born.

The Alexander's Star® Puzzle you buy in your local store is virtually the same as the one brought to us by Adam Alexander one year ago. If you think it's difficult to understand from our description, wait until you see how difficult it is to solve.

With billions of combinations, a fascinating mechanism, and 30 dazzling double-color pieces, Alexander's Star is a devilishly tricky and beautiful challenge that's a must for every puzzle fans' collection. In fact, its look is so intriguing that even your non-puzzling friends may get involved.

LETTERS TO THE EDITOR

Dear Tom:

I really enjoy working puzzles. I have three of your eight puzzles. *The Missing Link* is the most mind-boggling of them all to me.

Who invented *The Missing Link*™ puzzle? I would like to know the least time a person has worked *The Missing Link* in, and how many have been sold.

Jennifer Patten
Soddy, Tennessee

The Missing Link was invented by Marvin Glass and Associates of Chicago. We do not have any records on *Missing Link* solution speed records, but it can be solved in less than a minute. Approximately three million *Missing Links* have been sold.

Since receiving your letter, I have been timing myself on *The Missing Link*. I average about 70 seconds and have a 50-second personal record at the present time. I plan to time some of the top Cubists on *The Missing Link*. Before reading your letter, I never thought of timing anyone on this puzzle. Thanks very much for reviving my interest in *The Missing Link*!

Dear Tom:

Is there any interest in a contest to see who has the shortest unscrambling algorithm, measured by the number of turns instead of the time required to solve *Rubik's Cube*?

I average 55 to 60 turns, am under this 95% of the time, and never require more than 75 unless I blunder. I achieve this by finding combination operations where I place two cubies at once or combine placement and color alignment operations.

How about a videotape exchange?

Bill Pykaren
Seattle, Washington

You present a very interesting idea for a type of competition.

There is always a considerable debate about how to count a slice move. Both Dr. David Singmaster and Dr. Herbert Taylor insist that a slice move such as a center slice up should be counted as TWO moves, because it has the same effect on the Cube as giving both the left slice and the right slice one turn each.

What do your think, readers? Are you interested? Please let us know.

IDEAL RUBIK'S CUBE NEWSLETTER
VOL. 1 NO. 2

The Rubik's Cube Newletter is published four times a year by the Ideal Toy Corporation in Hollis, New York and is sent to each current member of the club.

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REVENGE: THE NUMBERS ARE IN

To Cubists and mathematicians, the problem of computing the number of distinct configurations on *Rubik's Revenge* was second only to the problem of solving the puzzle itself.

Herbert Taylor, Cube author and Cube Coach to World Champion Minh Thai, along with Professor Solomon W. Golomb of the University of Southern California, conducted independent calculations of the number of possible configurations on the 4 x 4 *Rubik's Revenge*™ *puzzle*.

The number of configurations is given by this expression:

$$7! \times 3^6 \times 24! \times {24!/(4!)}^6$$

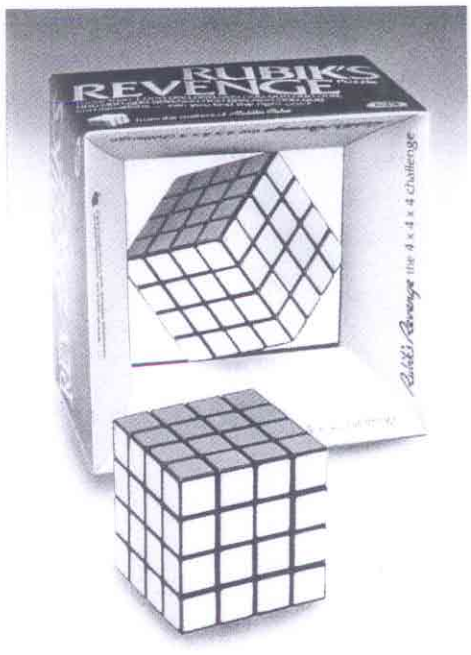
Note that (!) stands for "factorial." For example, 7! (or "7 factorial") is the mathematical shorthand for 7 x 6 x 5 x 4 x 3 x 2 x 1, a brief notation for a large number.

The number of configurations can also be expressed briefly as a product of powers of primes (prime numbers are those divisible only by themselves and one):

$$2^{23} \times 19^2 \times 17^2 \times 13^2 \times 11^4 \times 7^7 \times 5^9 \times 3^{22} \times 2^{30}$$

Herb then took this product to David Cantor, a Cubist and math professor at UCLA, who had his computers ready to print out all 46 digits of the decimal form of the number of configurations:

7,401,196,841,564,901,869,874,093,
974,498,574,336,000,000,000



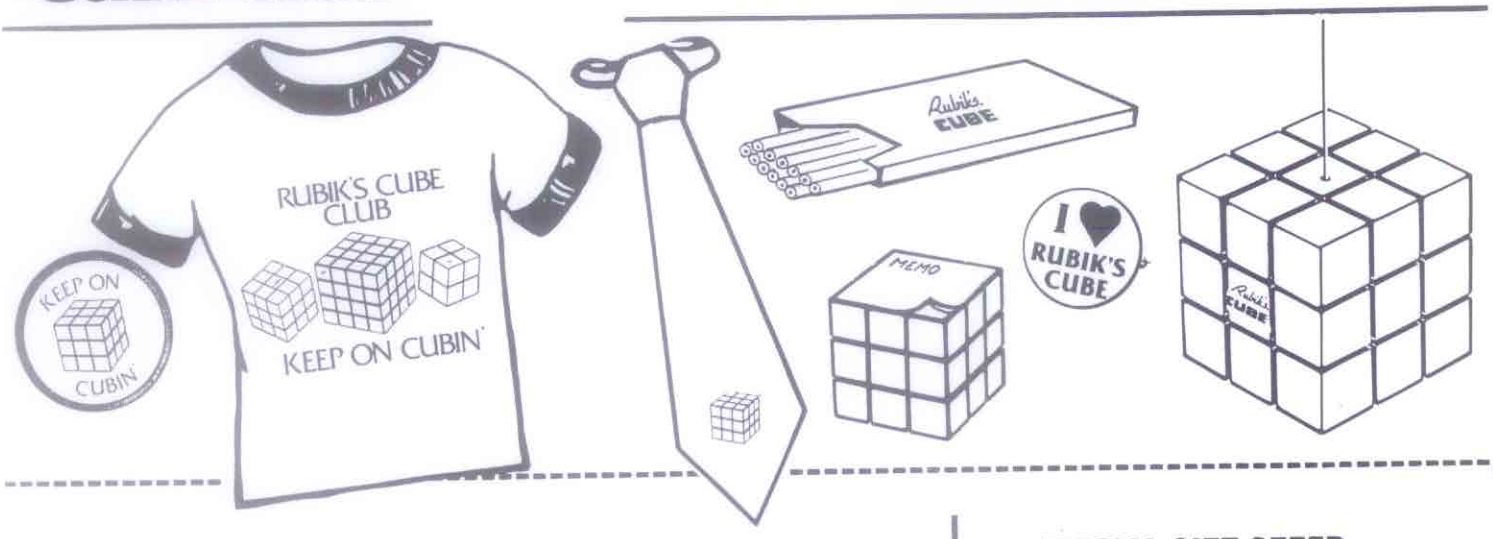
This is approximately 7.401 times 10 to the 45th power.

This huge number offers quite a tribute to the minds and hands of the Cubists who have already solved *Revenge* in under three minutes!

Incidentally, by the same computing process, the number of distinct configurations for the 2 x 2 *Rubik's Pocket Cube*™ is $7! \times 3^6$ or 3,674,160.

OFFICIAL RUBIK'S CUBE™ CLUB

MEMBERSHIP OFFER



IMPORTANT ORDERING INFORMATION FOR ALL CUSTOMERS:

Orders will not be processed unless tax & proper postage & handling charges are included with payment. Orders are payable by check or money order to the Official Rubik's Cube Club. No cash is accepted.

Please allow 4-5 weeks for delivery. Prices are valid for 90 days (except for specials) and are subject to change thereafter.

OFFICIAL CLUB T-SHIRT

Sizes: (circle your choice).

Children's: L(10-12) XL(14-16)	$5.95 ea. postpaid
Women's: S(32-34) M(36-38)	$6.95 ea. postpaid
Men's: S(34-36) M(38-40) L(42-44)	$6.95 ea. postpaid

- ☐ "Rubik's Cube" pencils $2.95 a dozen postpaid
- ☐ "Rubik's Cube" Buttons $1.00 ea. postpaid
- ☐ "Rubik's Cube" Patches $1.50 ea. postpaid
- ☐ "Rubik's Cube" 23-inch 3-D Hanging Mobile $8.00 ea. postpaid

SPECIAL GIFT OFFER

- ☐ "Rubik's Cube" Neck Ties $8.50 ea. postpaid
- ☐ "Rubik's Cube" Desk Memo Pads $6.95 ea. postpaid

Coupon expires December 31, 1982.

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BE A CLUB BOOSTER

Tell all your friends about our Rubik's Cube Club! If you sign up a new member with the application below, you will receive a $2.00 discount coupon good towards the purchase of a Rubik's Cube T-Shirt.

BOOSTER MEMBERSHIP APPLICATION

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Send in $5.00 check or money order to P.O. Box 72, Hollis, N.Y. 11423 and include this application form.

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PROBLEMS IN "REVENGE"

Cube News readers are invited to submit their most difficult, enjoyable and interesting Cube problems for publication in this column.

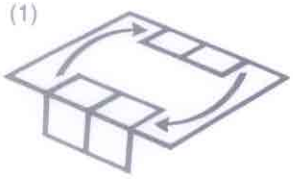
The following problems all refer to *Rubik's Revenge*.

(1) The entire *Revenge* Cube is solved, except that the two sets of middle-edge pieces on the top of the Cube must be switched. Plan a move that switches them and restore the rest of the Cube.

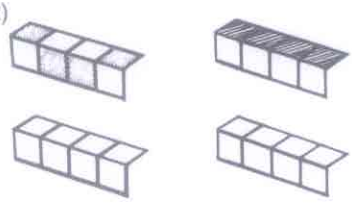
(2) The entire Cube is solved, except that two middle-edge pieces are switched and appear to be out of color alignment with their center and corner cubies. Correct this situation and restore the rest of the Cube.

(3) Move the three center pieces from their present positions (as shown in figure 1) to the desired positions (shown in figure 2). (Yes, centers can be moved to adjacent faces on the 4 x 4.)

(1)



(2)



(3)