M.C. ESCHER
WORKING WITH OPTICAL ART
POET OF THE IMPOSSIBLE

"IF ONLY YOU KNEW THE STRANGE THINGS I HAVE SEEN IN THE DARKNESS OF NIGHT." — M. C. ESCHER

A portrait, hands sketching, a building — the images on these pages are very ordinary. But are they really? One of the hands (left) is drawing a shirt sleeve. But, when you look again, the hand that is coming out of the sleeve seems no longer to be a drawing. It has become real and is drawing the sleeve of the original hand. The structure (above right) looks complicated but solid enough at first glance. The everyday details — the terraced background, the carefully drawn buildings, the woman hanging out her wash — make this look like an ordinary architectural sketch. But what do you see when you look closely? Water falls on a wheel then flows away through a brick channel leading again to the same waterfall. But how does the water get back up? How can it continuously fall two stories?

What kind of artist would create strange and fantastic prints like these? Probably one who looked as intense and haunted as the face in the portrait on the
opposite page. Maurits Cornelis Escher was born in 1898 in a small Dutch town. He was not a good student (especially in mathematics) and only made it through high school because of his art classes. His father, a hydraulic engineer, sent his son to architectural school, but after two days, Escher transferred to the graphic art department. He left art school in 1922 and moved to Rome. While living in Italy he travelled extensively, making many detailed prints of the scenes he saw. Then in 1935, feeling that a second world war might come, Escher and his family left Italy for Switzerland, then Holland.

In 1936, Escher had an experience which changed his life. On a trip to Spain, he went to the Alhambra, a centuries-old palace decorated with elaborate tile mosaic patterns. The artist had been searching for a way to visualize an idea that had been haunting him for some time — the concept of many different worlds existing in the same place at the same time. He had tried to express this in early prints, like the one on the cover in which the artist drew himself in a reflecting globe. The hand and globe seem to be in our space, while at the same time we see the artist’s reflection — not our own — in the mirror. Escher was not satisfied with these solutions, and after seeing the way in which the Moorish artists who built the Alhambra worked, his art changed completely. He spent the rest of his life back in Holland, hardly going anywhere except into his studio. There he made prints depicting a strange inner world filled with unnerving perspectives, impossible situations, and strange creatures that constantly changed identity. For many years Escher made little money from his prints, which were ignored by art critics until the 1960s, but he went on working anyway until his death in 1972.

In this issue, you will find out more about this extraordinary printmaker, as well as seeing the work of other artists who have used optical illusion in their art. Finally, you’ll have a chance to create an Escher-like optical pattern of your own.
HOW
ESCHER
CREATED

"THE PASSAGE OF TIME ON OUR JOURNEY THROUGH SPACE CAN BE SUGGESTED
BY THE REPETITION AND CHANGE OF SIMILAR SHAPES." — M. C. ESCHER
ost artists fit into a larger group or school, but M. C. Escher's half-real, half-mythical, impossible but logical world is unique. Until very recently, only mathematicians and physicists were interested in Escher's work because of the mathematical way in which he constructed his prints. The artist himself found this very strange: "I never got a passing grade in math. The funny thing is, I seem to latch on to mathematical solutions without knowing it. I imagine — now mathematicians treat me as their long-lost brother, and most of the time, I don't even know what they are talking about."

We've seen Escher's fascinations with the transition between two and three dimensions in the print Drawing Hands on page 2, and the impossible perspectives the artist created in Waterfall on page 3. But Escher was also interested in strange transformations. As a plant, an animal, or a person might change gradually over the years, Escher showed this passage of time by transforming shapes in logical stages.

How many different images can you find in the print, below left? How many kinds of fish and birds are there? But, how many basic shapes have been used? In the diagram, top left, Escher shows just how he created this print. He began with black and white diamond shapes (see sections 1-4) which slowly develop an outward bulge on one side, an inward one on the other (sections 5-7). Adding a few white, then black lines turns the shapes into birds (8-10), and changing the lines makes the shapes into fish (11,12). Escher made many prints in which he transformed one group of strange creatures into another. Big shapes gradually turn into little ones, up is down, inside becomes outside, over changes to under. What aspect of reality has Escher transformed in one of his most famous prints, Day and Night (above), in which two groups of birds seem to be flying over a flat, calm countryside? But what is so strange about this landscape? When you look at the print, your gaze probably goes to the diamond-shaped fields, then upward. The fields gradually change to birds flying high above two villages beside a river. The negative shapes of the background fields have changed into the positive shapes of birds in the foreground, one group flying into the sun, the other into the dark night.

In creating his unusual images, Escher found that the spaces between his shapes were just as important as the shapes themselves. At the top of the opposite page, the artist has developed the visual formula he used in designing the almost abstract pattern shown below it at the bottom of the page. Escher used the same formula to produce the haunting landscape on the left.
Imagine you are standing in a huge room looking up at the ceiling. Garlands, decorations, and friezes surround a round, dome-like balcony (left), open to the sky, from which children, women, and a large peacock look down. It all looks very real, but if you were able to get close enough, you could see that none of it is. Italian Renaissance artist Andrea Mantegna seemed able to create three dimensions out of two. He painted illusionary frescoes in churches and palaces that convey an amazing sense of reality. He usually framed his scenes in an architectural setting and painted them as though seen from below, the angle from which they were seen by the viewer. By combining his figures with details painted to resemble parts of the building, it looks as though we are seeing an actual scene through a three-dimensional doorway or window. The artist makes us question our senses, as we try to figure out which objects are “real” and which are not.

SHRINKING SPACES

Like M. C. Escher, 20th-century French artist René Magritte liked to transform one thing into another. In Magritte’s paintings, people turn into stone, boots grow toes, and fish become people. Also like Escher, Magritte altered natural laws — huge rocks defy gravity
MAGIC SQUARES

Is the work at the right a painting or a sculpture? Does it come forward and go back, or is it flat? Contemporary English painter Bridget Riley is one of the best known of a group called “Op” artists. These artists, like Mantegna, make us question our senses but in a modern, “abstract” way. This painting is made up of black and white rectangles on a flat canvas, but are you even able to make your eyes see the surface as flat? The artist has conveyed this effect by taking one basic shape — a square — and gradually changing it. Look at the bottom of the painting. As you look, what seems to be happening to the shapes at the top? When she created Movement in Squares, Riley almost captured a sensation on canvas. The picture seems to actually move, and we don’t so much see it as feel the vibrations of its movement.

and float, trains come out of fireplaces, and pictures break right out of their frames. Some of the artist’s strangest images were created by changing and combining everyday images. What would the painting on the left be like without the window? Would you be able to tell much about the size of the room the enormous, bloated apple sits in if this window weren’t there? And how does the spacious landscape outside make you feel about the space in the room? Magritte’s paintings transmit a sense of shock not only through their strange images but because the artist used ordinary objects and painted them in a realistic way. Why do you think he called this painting The Listening Room?
WHILE DRAWING I SOMETIMES FEEL AS IF I WERE BEING CONTROLLED BY THE CREATURES I AM CONJURING UP. THEY IGNORE ME DURING THEIR BIRTH AND I CANNOT MUCH INFLUENCE THEIR DEVELOPMENT. THEY ARE USUALLY VERY DIFFICULT AND OBSESSIVE BEASTS.

M. C. ESCHER
like most of Escher's images, the scene on pages 8-9 is made up chiefly of recognizable objects — stairways, tiles, doors — but have you ever seen a place like this House of Stairs? What kind of house is this and where could it be? Is it underground or suspended in space? What feeling do you get looking at this picture; how do the tiles and stones the house is made of add to the feeling? And who are the dozens of nightmarish mechanical creatures running in never-ending circles through this confusing maze?

Escher was always interested in unusual perspectives. Even at the beginning of his career, when he was making realistic prints like the one (at the top of the page) of St. Peter's in Rome, he would choose a very dramatic point of view (from the top of the dome in this case) and construct the perspective lines with mathematical precision. When he began creating his impossible, alien worlds, he would build them architecturally so they looked quite real. Escher produced the sense of dislocation that runs throughout his work by adhering to all the laws of logic, then suddenly violating one or two, such as gravity, scale, or perspective. He did many preliminary drawings for House of Stairs (like the one above, center) carefully building a framework for the building that looks so logical, you almost believe it could exist. It takes a minute to realize that the artist has constructed an impossible kind of perspective which causes the staircases to go in ways they couldn't possibly in real life. Instead of making all the vertical lines in the print straight and parallel to each other as they would actually be, he curved them (as they might be seen through the "fisheye" lens of a camera).

What about the strange beings that live here (see four small drawings above)? Since Escher claimed he was "absolutely incapable of drawing," he drew from detailed clay figures he modeled of these creatures. He then presented them as a scientific discovery he had made of animals that actually existed.
Escher constructed this complicated grid for *House of Stairs* using curved lines and two vanishing points.

"The *Pedalternorotandomovens Centrocatus Articulatus*, known as the Curl-up or Sausage Roll, came into being because of the lack of any wheel-shaped living creatures. It can climb any surface on its six human feet and see around corners and up flights of stairs with its bulging eyes. On long trips over level roadways, it presses its head on the ground and rolls at great speeds."

M. C. Escher created many alien worlds and peopled them with a variety of unearthly inhabitants. He constructed his prints with an almost obsessive mathematical precision. But if the artist had limited his interests to formulas, equations, and geometrical figures, his many prints would have had a very limited appeal. As the artist himself said, "What a pity the Moorish artists [who decorated the Alhambra] were restricted by their religion to making only abstract geometric shapes. It is the very recognizability of the birds, fish, and reptiles I use in my work that inspires me and gives me my never-ceasing desire to call up yet another universe."

*House of Stairs* is made of one central image (see dark area above), parts of which are reversed and repeated at the top and bottom. This structure is also designed to go on forever. If you take several magazines and join reproductions of the print on pages 8-9, top to bottom, you can see for yourself how the image never ends.
ARTIST OF THE MONTH

TONY BARNHART

REFLECTIONS ON ART

Reflections—in mirrors, in windows, on shiny metal surfaces—can show us the world in very surprising ways. Take a look at this month’s Scholastic Art-Award-winning drawing, above. The artist, nineteen-year-old Tony Barnhart, found out that the more he studied his own image and surroundings in some reflecting globes, the more strange and unusual objects he was able to find. What can you discover in this work? And can you pick out the most puzzling object of all—a mysterious Fifth Globe?

Tony created this intricate drawing while he was a student at Marion (Indiana) High School. Now he attends Indiana University in Bloomington, where he’s studying art.
When did you start getting serious about art?
It was in junior high. I remember a high school girl came to our class and showed us her portfolio. I was really impressed, and I thought to myself, I want to be that good. So I started spending a lot of time, putting together still-life set-ups at home, and so on. I might throw some clothes down on the bed to draw — anything that would make a good drawing.

How did you happen to draw these reflections?
My teacher brought in a bunch of the metallic eggs they sell L'eggs stockings in. I looked at them and I saw that they weren't just eggs; there were reflections in them, too. So I grabbed five and took them home. But it wasn't interesting enough with just the eggs — so I pulled out this old, worn-out striped shirt and put them on top of it. With all those stripes reflecting in the eggs, it became much more exciting.

How did you begin?
I looked at it for a long time. It was hard to figure out what I was seeing, because there was so much there. Once I got everything the way I wanted it, I blocked it in and just drew.

Three or four times a week I would go up to my room and shut the door. That's how I like to work — on my own, for hours at a time. It must have taken six weeks to do those eggs. I thought I'd never finish. I told my family, whatever you do, don't touch the eggs.

What made it so complicated?
The more I worked, the more I saw in the reflections. It was so weird — I'd see the reflection of one egg in another egg repeating over and over again. It drove me crazy. I had to look so hard it made my eyes hurt. There was so much that was repeating — the eggs, the room, the stripes. The stripes were endless, like waves going off into infinity. But they add so much that it was worth the pain of drawing them. And look how the room changes in each egg. Even tiny details like the ceiling.

the day they were sending work to the Scholastic Art Awards. I was still working on it. I finally finished a couple of minutes before they took the package away. As it was, I had to get rid of the fifth egg. There was no time to put it in. But maybe it's still in there somewhere — in a reflection — because it was in the set-up until the end. (Look in the back egg. It reflects the three front eggs as well as an "invisible" fifth one on the right.)

When you look at this drawing now, does it look like the real world?
It looks pretty much like my room. I always go for the details. I'm not abstract at all — I like to make something look like it's right there in front of you.

But do the reflections suggest anything surprising or extraordinary to you?
Well, the reflections do look kind of strange. Four eggs reflecting a room — each in a different way — it's like four little worlds. For a while I thought, do I really want to put myself in there? But I'm glad I did. It gives a human quality. It's funny — there's a reflection of a drawing of mine on the wall. I guess there's quite a bit of me in there.

Could you give any tips on doing a drawing like this?
Just spend hours working on it. I do drawing after drawing. When I finish one, I ask myself, what do I need to improve on? Then I try to make it better in the next one. People usually say, "Oh, that looks fine." But I always feel it can be better. Nothing's perfect. But that doesn't mean I don't enjoy it. I love spending time on a drawing. That's when there's just me and the pencil and the paper.
Next time you are looking at TV, watch as the titles at the beginning of the show change, or one logo turns into another. Can you pick out the various stages that make up the transition? M.C. Escher was interested in these same kinds of changes or metamorphoses. In fact, he did a huge mural (*Metamorphosis II*, below) in which he changed a single shape dozens of times. In this workshop, you’ll create an Escher-like metamorphosis of your own.

**Materials**

- 12" x 18" white sketch paper
- 18" ruler (coins taped under ruler will prevent ink from running under)
- Compass
- #2 School Pencil
- Black felt marker
- 12" x 18" oak tag paper
- India ink
- Fine pen point and holder
- #5 watercolor brush
- X-acto knife
- Vinyl eraser
- Rubber cement

**Starting Out**

1. Before drawing, you might observe or research the way in which natural shapes can change—a drop of water spatters, a ripple expands, a wave breaks, a bud blossoms, an egg hatches, a caterpillar becomes a butterfly. Begin with one geometric shape (circle, square, triangle, diamond, half-circle) and, in no fewer than six and no more than 10 stages, gradually change your shape to another. You can develop a system for this transition by first sketching a grid of square or rectangular units.
2 Plan your positive (dark) and negative (light) areas by shading with a black felt marker. (Can the positive shapes be light, the negative ones dark?) Try several versions. Your metamorphosis can move left to right, top to bottom, right and left to center. The format can be horizontal or vertical.

3 Once you have planned your final metamorphosis (each stage should be an interesting shape in itself, in addition to working as part of a sequence), redraw it on oak tag paper. Practice with India ink, pen, and ruler first, then put a lightly pencilled “X” in areas to be inked (to avoid accidentally blacking in the wrong area). Use pen to outline shapes, then brush to ink positive and negative areas. Try to keep edges crisp and clean — an X-acto knife can be used to scratch off minor ink errors. Erase pencil marks. Cut out design and mount or mat (using 3” border) with rubber cement.

SOME SOLUTIONS

In creating your metamorphosis, you have to develop a system so your shape can change as part of a logical progression. The inside could move outside; it could break apart (split, explode, melt); one part could expand while another contracts; one side might move to the other and back again. When you are done, you might want to make your design actually move by adding more transitional stages, cutting the units apart, and stapling them to make a flip-book.
ARTS ALIVE

OPTICAL ART

M. C. Escher wasn't the first Dutch artist to be interested in startling optical illusions. Many of the Dutch Old Masters liked to create illusionary works such as this 17th century "perspective box." Can you tell how many corners this construction has and where they are? Which is the "real" floor and what about the ghostly chair sitting on it? You can see this strange work and 50 other paintings by artists like Rembrandt, Ruisdael, and Steen in Dutch Masterworks from the Bredius Museum at the National Academy of Design in New York City until Jan. 6. The show will then travel during 1986-87 to the Walters Gallery, Baltimore; the N. C. (Raleigh) Art Museum; Joslyn Art Museum, Omaha; the Speed Museum, Louisville; the Allentown (PA) Museum. Exact dates to be announced.

THE 'NEW' PAINTING

In last month's Art & Man, you read about Georges Seurat and the French Impressionist painters who used color in a new way. Seurat first showed his work in the controversial Impressionist Exhibitions that changed the history of art. To celebrate the 100th anniversary of the last of these famous shows, 200 of the works originally shown have been gathered together in The New Painting: Impressionism 1874-1886. The exhibition will be at the National Gallery of Art, Washington, D.C., Jan. 17-April 6, then goes to the M. H. de Young Memorial Museum, San Francisco, April 19-July 6.

THE NEW WEST

M. C. Escher's prints are strange but also very realistic. The same could be said about a new group of photographs—120 larger-than-life portraits of men and women who work at hard and uncelebrated jobs in the western United States. The photographer Richard Avedon travelled for five years from rodeos and threshing bees to mining camps and drilling sites, taking pictures of over 750 people. The results can be seen in a new show, In the American West, which will be at the Corcoran Gallery, Washington, D.C., until Feb. 16. Then it will go to the San Francisco Museum, March 14-May 11; Art Institute of Chicago, May 29-Aug. 3; Phoenix Art Museum, Aug. 18-Oct. 12; Institute of Contemporary Art, Boston, Feb. 17-April 16, 1987; High Museum, Atlanta, Sept. 15-Nov. 15, 1987.