With just a moment's study of the wrap-around bracket on the TDC camera, it becomes quite evident that the camera can be manipulated completely without the hands ever coming in contact with the bracket. Though not new, this type of bracket has been largely overlooked in spite of its many advantages.

The use of 1/8" strap aluminum makes it only a minor chore to saw, file, or bend to your particular need. If your camera has a moderately sized central sight and you wish to come up the front, a well placed hole should solve this problem.

The components are readily available and only one caution needs to be mentioned. Most flashes today have a hot shoe tip which makes it mandatory that you either use a plastic clip or be sure to relieve the center of a metal one if it is used.
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Front Cover:
An East German border tower seen through a hole in the Berlin Wall, January 12, 1990. This view and others by Gerd Schulte documenting the beginning of the end of the wall are found in the feature “Stereo at the Wall.”
Two of the matters covered in this issue are directly related to the stranger-than-fiction changes in world politics that began dominating the media late last year. The Berlin Wall stereographs by Gerd Schulte provide at least a basic stereo documentation of what, besides being one of those “pivotal points” in history, was also one of the greatest photo opportunities ever available for pros and amateurs alike. It would have been unthinkable for such an event to have passed with no stereo images being made at all.

With any luck, other stereo records of events in Berlin (and perhaps even other key locales in eastern Europe) will surface at least by the time of the International Stereoscopic Union Congress in Monaco in fall, 1991. The other matter is the question of the Soviet Fed Stereo camera, covered in added detail in this issue’s Nmviews. Hands-on testing and examination of the camera reveals it to be less than ideal but more than expected—being “generally a delight to handle and use” and giving “excellent stereo results.” Nothing, to date, is known of its eventual availability. That may be as much dependent on geopolitical changes as on progress with manufacturing and marketing considerations. Not just improvement, but maybe even the basic functioning of the Soviet economy could be determined by the intertwined dilemmas created by the expectations and demands of ethnic and national groups. (Not to mention western responses to how the Soviet government deals with those people and dilemmas.)

If early reports are correct, and the Fed Stereo is being made in Kharkov, complications could arise from the results of growing nationalist feelings there, as Kharkov is in the Ukrainian SSR. General international availability of the Fed camera may well depend on positive solutions to any number of disputes in and between several countries and would-be countries. It has the potential to help move things in a positive direction, being the kind of unique product that could make a contribution to Soviet world trade. Given an eventual chance at the needed trade and economic circumstances, the “Fed CTEPEO” could help in its own way to fulfill the hope of Oliver Wendell Holmes when he wrote, “The stereograph . . . is to be the card of introduction to make all mankind acquaintances.”

Bulk Blues

Members who get their copies of Stereo World via the basic, bulk mail subscription had to wait, in many cases, an entire month longer than first class subscribers for the Sept./Oct. ’89 issue. That issue was of course already late enough, but we are contacting the Postal Service to determine if there has been some change of policy regarding bulk non-profit organization mail. In any case, the worst of the delay will shrink as we catch up with the calendar in our own production schedule. For the first half of 1990, Stereo World will be, in effect, a monthly effort aimed at reaching members at least sometime within the months named on the cover by later this year.

The First NSA View-Master
Three Reel Packet
A Limited Edition Collector’s Item!

Reels A & B contain scenes from some of the programs presented at NSA PORTLAND 89, the 15th annual convention of the National Stereoscopic Association, Aug. 4-7, 1989, Portland, Oregon.

Reel C is a collection of scenes from several View-Master “DR and Plant Tour reels and is the only commemorative reel to be published as a token of the 50th anniversary celebration.

Packets are $6.00 including postage from NSA, Box 398, Sycamore, OH 44882.
Stereodipity

Most people respond to our request for accidental stereo pairs by sending in photos from ads or comparison photos from photography magazines. But Denver NSA member Willard Johnson has been on the lookout for them since the 1950s, and sent in some samples of the sort of unexpected results you can get by a slight rotation of repeated patterns that show no 3-D clues in their original orientation. All you need to do is some clipping and twisting to find more stereodipity than meets the eyes — perhaps the true secret of "cold fusion."

Wrappers with repeated logos are a good source, if you experiment with the alignment.

According to Mr. Johnson, "Words fail me when I attempt to explain this." First, fuse the two guide lines at the top, then read the words out from the center.

Groups of repeated coupons or small ads can produce interesting results — especially when type has been compressed or expanded differently in otherwise matching examples.
One of the selections in the recently published Netherlands 1857/1920 Seen Through the Stereoscope is titled “Looking through a hole in the wall of time.” While this could well be used to describe the viewing of any vintage stereograph, it could as easily be applied to a stereo image only a week old. The “hole,” once created, will exist as a portal regardless of how recent or ancient the scene may be — and it will present it in a way no flat photo can match. Of course the more historically interesting the scene or event is, the more people now and in the future will wish to gaze through the hole.

The cover view by NSA member Gerd Schulte, taken through a hole in the Berlin Wall in January, 1990, provides us a literal “hole in the wall of time” that already seems like a stereo peek into history. Both the electronic and print media have flooded us in recent months with images, from around the world, of history not just changing but accelerating — as if in its own frantic race with copy writers and video editors. As dramatic and astounding as the scenes flashing across our TV screens have been, what owner of any functioning stereo camera could watch the sensory overload of historic images without wishing to be in at least one of those places! To be there, between the network vans or the amateur camcorders, capturing some of it in the depth it deserves.

Gerd Schulte lives in Berlin, and with the help of Dieter Lorenz, has shared with us some samples of his full-frame slide pairs documenting the end of the Berlin Wall. A few other stereographers may have been recording events on the streets of east and west Germany as well, possibly including the March election campaigns in the GDR. As for the rest of eastern Europe, the Soviet Union, South Africa, or Central America, recent stereo holes in the wall of time will be few if any. The future will have to be satisfied with miles of flat video tape.

East German border guards line the top of the wall at the Brandenburg Gate, Nov. 11, 1989. While several new crossing points were being opened that week, this symbolic location drew throngs of West Berliners and the media.

One of the larger East German border towers seen through a hand-made hole in the Berlin Wall, Jan. 12, 1990. All stereos by Gerd Schulte.
All ages watch from around (and on) the wall as people flow through the new opening at Potsdamer Platz, Nov. 12, 1989. This scene is also illustrated in a wide-angle photo on pages 114-115 of the April '90 National Geographic.

A fenced-off portion of the now dangerously weakened wall near the Brandenburg Gate, Jan. 12, 1990.

By February, the wall had become a place to be photographed and to chip off souvenirs. This section is near the Brandenburg Gate, Feb. 21, 1990.

Seldom has one of history's most symbolic props been so easily accessible to the public. A view from the top, near the Brandenburg Gate, Feb. 21, 1990.
Ten Million Stereo Views A Year

by William Brey
Impossible you say?

How could one company sell ten million units of anything in the days before the advent of mass merchandising methods and national advertising? Well, the Underwood brothers did just that — by knocking on doors throughout the country. They were not the first to sell stereo views door-to-door; however, the system they devised proved more successful than any others up to that time. Over a period of thirty years, the brothers built a production and sales organization that surpassed all that had preceded them.

B. W. Kilburn of Littleton, New Hampshire was the first American company to sell stereo views door-to-door in several New England towns during 1879. Within a few years Kilburn agents, working on a straight commission, were selling views door-to-door over a good part of the Northeastern and Midwestern United States. It was only then that the young Underwood brothers made the career moves that ultimately resulted in their taking the lead in the creation of the world's largest stereo view business.

Elmer and Bert Underwood, sons of the Reverend E. Underwood, were born in northern Illinois — Elmer in 1859 and Bert in 1862. For many years their father had been a missionary for the American Sunday School Union. The family moved to Ottawa, Kansas in 1878 where both boys worked part-time and attended the University.

Elmer started a publishing business there in 1879 that became quite successful. Bert meanwhile worked in a grocery and then for the White Sewing Machine Company in Kansas City before becoming a sales agent for a medical book which he peddled from door-to-door throughout his assigned area on the edge of Indian Territory. (He chose this line of work because his physician advised him to spend as much time as possible outdoors.) A natural salesman, Bert became known among the farmers as "that boy who sells a book to everyone." During his book selling trips in 1881, he met an agent for stereoscopic views and became convinced that if the merits of the then "out-of-date" stereoscopic views could be properly presented to the public they would prove to be...
fast sellers. Ordering a stock of views and a stereoscope he began to formulate a system for selling them that proved immediately successful. Bert urged his brother to join him, but Elmer hesitated to leave his established and successful business.

Bert’s sales grew so fast, however, that within a few months he persuaded his brother to sell his publishing business and join him in expanding the stereo view business into other areas. At that time, the Underwoods were selling the stereo views published by Charles Bierstadt (Niagara Falls), J. F. Jarvis (Washington, D.C.) and the Littleton View Company, (one of B. W. Kilburn’s competitors) in the sparsely-settled areas west of the Mississippi. (Some of these early views have been found inscribed on the back “Sold by Underwood and Underwood, Ottawa, Kansas.”) In a year’s time the brothers had established their own group of sales agents (all trained in the Underwood method) working in Missouri and Kansas. The Underwoods directed this sales force from a small office in Ottawa, Kansas.

Many of these agents were recruited from colleges and universities. Some of the better salesmen among them earned enough during the summer months to pay their entire college expenses for the year.

During their early expansion, the Underwoods personally trained new agents in the elements of their system. As their business grew, they documented the system in a manual that taught their agents how to successfully sell stereo views.

To learn just how these agents plied their craft, a copy of their Sales Manual for 1890 was examined at the Oliver Wendell Holmes Stereoscopic Research Library. The following information was extracted from it.

The Underwoods divided their sales effort into two parts — the canvass and the delivery. Canvassing included gaining a hearing, creating a desire to buy and obtaining a small order for a stereoscope or views. Upon delivering the original order a week or two later, they made their major pitch to sell more views.

The manual took the new agent, step by step, through a typical sales call, telling them what to say and how to handle all objections. The agent was instructed to greet the person answering the door with: “I have something very beautiful I want to show you. It will take just a minute.” No mention was made of the product they were selling. If the prospect hesitated, they added: “It is something new in this line, and I can show you much better and easier than I can tell you.”

If told there was no interest in buying anything they countered with: “Oh, I am only showing now and I have something so interesting I do like to show it. You can spare just a minute.”

After gaining entrance, the agent laid his case down and removed the stereoscope saying: “Of course you have a stereoscope.” If the customer did not, the agent stated that they have never seen views through this type of glass. “Everyone says it is the finest lens they ever looked through.” The important thing was to get the customer seated and to hold the scope. The manual advised the agents to insert each view into the scope before taking the preceding one out so the customer was always looking at something, the better to hold their attention. They made each view as interesting as possible by pointing out the objects of value, beauty or novelty in each. For example, “Phoebe’s Arch, Palmer Lake, Colorado. Notice how far through that arch, across the landscape you can see. That farthest mountain is thirty miles from the arch. Isn’t it something wonderful to cover such distance in a view?”
words have the power to make him see.”

They credited the glass for the beautiful details and distances brought out in perfect relief. They dwelt on the power of the glass as a sale of the scope obviously produced a demand for views.

They attempted to close the sale by saying: “If I will bring you just as good a lens as this is in about two weeks, you will want one of them won’t you? This scope is only ninety cents and if the one I bring is not as good as this don’t take it. Our views cost 16½ and 8½ cents each.” Price was only mentioned after they had shown a number of sample views.

The agent then advanced numerous reasons the customer should have a stereoscope in their home — they cost very little and yet are so interesting; if company comes they can help entertain themselves with a stereoscope and a collection of views; children read, hear people talk then study about places in the views; they can never visit all these places as it would cost hundreds of dollars to visit only a few and the stereoscopic views, as seen through a good glass, will give them a better idea than they can get in any other way. The agent concluded with: “Well, I shall put you down for the glass, shall I not, as it’s only ninety cents.”

The order was written up for “Scope and Views” and the customer was told: “You see, I have put you down for a scope and left the views indefinite. When I bring around your scope I will have a fine collection of views and our $2.00 per dozen views are the finest in the country.”

If the customer already had a stereoscope, the agent switched the emphasis away from the lens, crediting all the fine effects to the superior quality of the clear sharp views, all from original negatives taken by the best view artists in the country. An order was taken for a small number of the views examined or sometimes just for “views” with the understanding that the customer could make a selection from a whole assortment of three or four hundred subjects when they made their delivery. The agent worked prominent names into the sales pitch to influence the customer: “Dr. Jones liked that view very much. I have his order for a collection.” The agents were told that local personal influences of this kind are impossible for anyone to resist entirely.

The experienced agents carried a small folder containing a list of prominent local people and their avocation who had purchased views. These were shown to the prospect with the comment: “Here is the Mayor you see, the Minister, the Postmaster, and of course, these Doctors, who have all purchased views for their collection.” Business cards of their customers were inserted in the folder that contained written comments about the views purchased — “Interesting — fascinating. Worthy of attention”; “Unusual, Educational and most entertaining.” One of these sales aids is on file at the Holmes Library containing 32 names and business cards of prominent customers in one city.

As a general rule, the agent was instructed to canvass house-to-house for two weeks, if possible, starting on the best street in town, and then deliver continuously until all the orders were filled before canvassing again.

The great secret of moneymaking with views, it was emphasized, was to canvass their territory thoroughly — exhaustively. It was easier to build up the order if many of the customer’s neighbors were taking views. They were advised not to be easily put off as “NO, is not always an answer in canvassing any more than in courting.” Persistence wins the day.

The manual also offered advice on how the agent should conduct himself while on the road. They were admonished to find a good boarding place, keep the best of company and not talk politics. If a Christian, to go to church Sunday and make themselves at home in prayer-meetings or the Y.M.C.A. rooms. To be neat and clean in attire, to dress well and never boast of his business, only talking about his views when actually canvassing. (No mention of female agents has been found.)

The agents were advised to order a good supply of views from the main office so that more than the first few customers would have a complete assortment to choose from during delivery. When the views were received, the agents were directed to study them and become familiar with the history and points of interest shown, using the descriptive catalog provided to help interest the customer in them.

For the delivery phase of the sale, they were advised to purchase an ordinary 18 inch valise and pack 8 stereoscopes in one side with a large
assortment of views in the other. In this way, they had enough for a half day’s delivery, returning to their room for additional stock for work in the afternoon.

When delivering the scope, it was important to once again get the customer seated to try it out. Views were shown in the same manner as when canvassing, having the customer decide on each view separately, laying aside those they wanted to keep. If the customer protested: “Oh, I have more than I can take now,” the agent replied: “Why this is only a start — you have an opportunity to obtain the finest views that have ever been made and it will pay you to take advantage of it and get a good collection. Your scope is not so interesting without a nice collection. The more you get the better.”

The agent was reminded not to lower prices as that lowered the value of the goods in the minds of the patron. However, to clinch a large sale, the agent would offer a free stereoscope with an order for six dozen or more views!

In addition to their first class views, the agents carried a small number of copied views that they sold for three cents each. The purpose was to counter the customer’s objections that they could buy views cheaper elsewhere and to prove the superiority of their more expensive views. By downgrading these views with the comment: “These are copies. We carry them only for a cheap class of trade,” they seldom had to show them. They also carried hand-painted views and French transparencies with them that sold for 25 cents each, but no attempt was made to sell those until after they were paid for the scope and views originally ordered.

Using these successful methods, Bert expanded their sales force into western Iowa, Nebraska, Dakota and Minnesota throughout 1884. At the same time, Elmer built the business in eastern Iowa, Illinois and Wisconsin. By the end of the year, they covered Kentucky, Tennessee, Arkansas and Louisiana with their agents.

The following year, Elmer worked his way east into Pennsylvania and in a year and a half built the foundation of an immense business through the populous eastern and southeastern section of the country. Meanwhile, Bert crossed the Rockies, covering the Pacific Coast, from San Diego to Puget Sound, with agents. Busy boys!

The Underwoods claimed to have sent out 3,000 college students in one summer. Agents traveled by bicycle, or horse and buggy in farm country, and were sometimes invited to spend the night with their last customer, paying for their room and board with stereo views.

A few agents used their experiences with the Underwoods to go on to bigger and better things. One was James M. Davis, who became the exclusive Sales Agent for Kilburn stereo views. Another was B. L. Singley, founder of the Keystone View Company of Meadville, Pennsylvania. Keystone, in time, became a strong competitor to the Underwoods.

Outgrowing their single supply house in Ottawa, Kansas by 1887, they opened an office in Baltimore to supply all the territory east of the Mississippi. That same year they also secured control of the stereo views produced by Strohmeyer & Wyman. The combined capacity of their four suppliers, Bierstadt, Jarvis, Littleton Views, and Strohmeyer & Wyman was ten million stereo views per year. A Canadian office was opened in 1888 to handle the large sales there.

Underwood and Underwood expanded into Europe in 1890 when Bert opened a branch in Liverpool, England. He personally ran the office for three years, creating a renewed interest in stereo views there.

They moved their Baltimore office in 1891 to New York to better serve their growing sales overseas. By
1894, they were selling their views wholesale or through agents in all European countries, Australia, New Zealand, South Africa, India, Japan, Cuba, Mexico and nearly every country in South America. In that year, the Underwoods shipped three million views to England retailing them for $2.00 a dozen. 160,000 stereoscopes were also sold there for $1.00 each.

Gradually, the Underwood firm began to publish their own original views to supplement already established trade lists of their four suppliers. In 1891 Bert took lessons in photography from M. Abel in Mentona, France. His sales experience in the type of views that sold well helped him produce views that became quite popular. The excellent travel views of Italy, Greece, the Holy Lands and Egypt, published under the U&U label, all were produced from Bert’s negatives.

While in Rome, Bert arranged to photograph Pope Pius X in stereo, producing a 12 card set on “The Pilgrimage to St. Peter’s and the Vatican.” After presenting a set to His Holiness, the firm received the following note from a Cardinal at the Vatican:

“His Holiness Pope Pius X., wishes me to tell you how much He had admired the stereoscopic views which Messrs. Underwood & Underwood have kindly presented to Him. As a token of His special appreciation of these very interesting photographs, His Holiness bids me send you in His name a silver medal together with His thanks.”

It was not until 1897 that the company supplemented Bert’s work by employing their own full-time photographers and using free-lance operators for specific assignments.

By 1901, the firm had finalized the design of the U&U logo on their stereo views and were publishing over 25,000 views a day of their own. They also sold 300,000 stereoscopes a year — a prodigious output that made the firm the largest of its kind in the world.

Their stereoscope supplier was Henry E. Richmond, a native of Bennington, Vermont, who had established a stereoscope factory for the trade around 1890, in the small town of Westwood, New Jersey, population 838. The factory was just fifteen miles from mid-town Manhattan and employed about thirty people. His factory ground the lenses, cut out the wooden parts, stamped and shaped the aluminum hoods, binding the edges with velvet. Those he made for the Underwoods were stamped on the hood with the words “Sun-Sculpture” surrounded by their rising sun trademark. The factory was a two-story building with a water tower that supplied water to the town of Westwood. (See Illustration.) U&U apparently purchased the factory around 1901 and retained Richmond as their Manager through at least 1914.

They also purchased a factory from Strohmeyer & Wyman in Arlington, New Jersey, eight miles from Manhattan, that produced both stereoscopes and views. Seventy persons were employed there in 1906. One of the Underwoods’ more famous staff photographers, James Ricalton, was from Maplewood, New Jersey, just a few miles from their factory in Arlington. Their Westwood factory produced stereoscopes exclusively, employing 10 men and 20 women the same year.

At the turn of the century, the Underwoods introduced their unique boxed set of views — a sequence of views that simulated a tour of the country depicted. Some views had captions in 6 languages printed on the back. A descriptive guidebook accompanied the views which included a map showing the exact location and boundaries of the views in the set.

U&U Guide Books were edited by some of the most eminent scholars of the day. The popularity of these travel sets and guidebooks made it difficult for smaller companies to compete and was responsible for some of them closing up shop and selling their negatives to the Underwoods, which grew even bigger as a result.

Their boxed sets and books became immensely popular, forming the bulk of their output for the next 15 years. Their sales literature pointed out — “The Underwood Travel System is largely mental. It provides Travel not for the body, but for the mind, but travel that is none the less real on that account. It makes it possible for one to see as if one were present there in body — in fact to feel oneself present — and to know accurately famous scenes and places thousands of miles away, without moving his body from his armchair in his comfortable corner; indeed, it enables him to take up one standpoint and then another with reference to them and so see them as a whole, and to study them minute-ly, just as one would on a visit to the places in the ordinary expensive way.”

By 1910 they had 300 different stereo view sets for sale and had diversified into the new field of

![The Underwood's Stereoscope factory in Westwood, New Jersey, around the turn of the century. Their manager, Mr. Richmond, is standing behind a camera on a tripod. Lother Dolph's position with the firm is not known. (Courtesy Cheryl Todd, Town Historian of Westwood, New Jersey.)](image-url)
News photography. As stereo views declined in popularity, their News Division grew. They ceased production of all stereo views in 1920, selling their stereo negatives to the Keystone View Company, which continued to produce Underwood inspired travel sets, primarily to schools. Shortly after the Underwoods retired, the company was reorganized as Underwood & Underwood News Photos, Inc. In 1943 Bert Underwood died in Arizona. Four years later, Elmer died in St. Petersburg, Florida. The Underwoods' vast collection of news photos, nearly 2 million prints and negatives, were acquired in 1978 by an investment group that makes them available for a fee to publishers, authors and the general public through the facilities of Bettmann Archives in New York City. Underwood & Underwood News Photos is listed to this day in the Manhattan telephone directory. Not bad for two lads from Ottawa, Kansas.

Sources
Oliver Wendell Holmes — His Pioneer StereoScope and the Later Industry


View-Master History
Reprint Available

The feature “Seven Billion Windows on the World — View-Master Then and Now” appeared in the now out-of-print Mar./Apr. ’84 issue of Stereo World. This 18 page illustrated history of the View-Master company has now been reprinted in a separate, updated version and is available for $3.00 including postage from the NSA Back Issue Service, Box 398, Sycamore, OH 44882.
The acquisition of View-Master Ideal Group by Tyco Toys Inc. is now official but the name on the water tower in Beaverton, Oregon still reflects the name of the product we know and love: View-Master.

Tyco Toys had a net income of $11.7 million on sales of $263.8 million in 1988. The acquisition of the View-Master Ideal Group was completed in September in a cash-and-stock deal valued at $56 million. This buyout helped strengthen Tyco’s weak position in the girls, games and preschool market segment and is seen as favorable both to the toy industry and to View-Master itself. (View-Master suffered losses of $11.4 million on sales of $41.4 million in the first half of 1989.)

Although Tyco Toys has a few marketing ideas of their own, View-Master as we know it will, for the most part, remain the same. View-Master will continue to employ approximately the same number of employees (about 770 worldwide) but is cutting back on their marketing staff and closing their showroom in New York. A few product changes are being made, but these have basically resulted in a return to original packaging designs.

Early last year, the blister packet was redesigned placing the plastic bubble containing the three VM reels on the back of the packet. This style became known as the “reverse blister packet.” Titles in this format include Star Trek the Next Generation, Legend of Indiana Jones, The Flintstone Kids, and Hollywood Mickey.

When Tyco management viewed the new packaging they decided it was not as saleable as the original blister design with the reels on the front and subsequently decided to discontinue use of the “reverse blister packet.” New packets have already been released in the original blister format, such as Gumby & Mario Brothers 2.

Also discontinued by Tyco are the new gift boxes that completely enclose the viewer and reels. Tyco feels the “pick up and see” boxes are more in line with presenting the 3-D concept of the product. Some gift sets, such as Ghostbusters, were available in the enclosed box and have also been re-released in the “pick up and see” format.

Another idea VM started last year was the use of character pictures on the back of the reel to help identify each story set. This feature is being discontinued because of the cost involved when printing the reels on both sides.

The introduction of a new red mono projector with a yellow lens was scheduled for last year as well, but this projector has not been released because of difficulties using the red and yellow colored plastics which were not opaque enough for proper imaging. In the 1990 catalogue, View-Master is once again promoting the blue projector with the green lens.

(Continued on page 22)
Arizona Landmarks have always been popular subjects for local Arizona photographers and the major stereo publishers in the eastern United States. The most popular local subjects were Oak Creek Canyon's Red Rock Country, the Casa Grande ruins, Montezuma's Castle and Well, and Mission San Xavier del Bac. The most popular Arizona subjects that were published nationally by twentieth-century stereopublishers and by local eastern and major nineteenth-century stereopublishers were the Grand Canyon and the Hopi Mesas. A major factor in the local and national popularity was accessibility. Most of these areas became more accessible with the growth of settlements and the construction of the railroad. All of these areas functioned as tourist attractions to local residents and those travelling west to California. Stereographers helped to satisfy demand for views of these areas.

Views of these areas usually took up most of the local photographer's negative file because there was always a demand for them. Some areas such as Canyon de Chelly were less frequently stereographed due to its remoteness in the far northern part of the Territory. After O'Sullivan's stereographs during the Wheeler Survey about the only person who would have taken any stereographs of Canyon de Chelly was George Benjamin Wittick. The popularity of the previously mentioned subjects assured their publication as stereographs because they represent the West's natural wonders.

The Grand Canyon has been the most frequently photographed of Arizona's natural wonders. Since 1871 coverage has been extensive. In fact, it has been more frequently stereographed than the Hopi Mesas, San Xavier del Bac, and the Casa Grande Ruins.

The Colorado River winds through the Grand Canyon for 277 miles. The River divides the park into the South Rim and the North Rim which are eleven miles apart. The Grand Canyon is a mile deep and eighteen miles wide. The South Rim at a lower elevation is the one most frequently visited by tourists today. The South Rim at an altitude of 7,000 feet is where the El Tovar Hotel (built in 1904), Bright Angel Lodge, the Hopi House, Phantom Ranch, and the Grand View, Bright Angel, and Kaibab and West Rim trails are located. There are also a number of areas that are lookouts into the canyon named Hermit's Rest, Desert View, Moran Point, Maricopa Point, Mojave Point. From Mather Point on the East Rim to Hermit's Rest on the West Rim the trail is continuous. Burros can be used to travel into the canyon on certain trails such as the Grand View. The altitude at the bottom is about 1,000 feet and during the summer temperatures can top 120 degrees. On the top of the South Rim there are pine and juniper forest, while at the bottom it is desert.

There are at least three routes to the South Rim of the Canyon today. The first and oldest route is sixty miles north of the town Williams, which is located about thirty miles west of the town of Flagstaff. William Wallace Bass is credited with building the first road to the Canyon from Williams during the 1880’s. From Flagstaff there are two routes to the Canyon. The first follows U.S. Highway 180 angling northwest on the west side of the San Francisco Peaks. It meets Arizona 64 thirty miles south of Grand Canyon Village on the South Rim. The second route runs from U.S. 89 north from Flagstaff almost to Cameron on the Navajo reservation, then west on Arizona 64 to Desert View. During the nineteenth century, before there was any development along the South Rim, there was a route from Williams to the tiny village of Peach Springs and then into the Canyon.

The North Rim at an altitude of 8,000 feet is located on the Kaibab and Walhalla Plateaus and is covered with tall groves of aspen, spruce, and fir. It is less accessible than the South Rim and contains fewer tourist facilities. Grand Canyon Lodge is the only lodge located on the North Rim. There are four major View points on the North Rim: Bright Angel Point, Cape Royal, Point Imperial (8,800 foot altitude), and Point Sublime. The major trail is the North Kaibab.
One of the most beautiful sites on the North Rim is the Toroweap Overlook located in Toroweap Valley which is a wide break in the plateau. The North Rim can be reached by driving north from Flagstaff on U.S. 89 to Bitter Springs, then north and west of U.S. 89A to the turnoff of State 67 at Jacob Lake. From Jacob Lake it's thirty-two miles to the North Rim.

On the north side of the Grand Canyon in Arizona's northwest corner is the Arizona Strip. Marble Canyon is the eastern entrance to the Arizona Strip and its cliff walls composed of redwall limestone rise to 800 feet.

Four miles north of Marble Canyon is Lee's Ferry where the Paria River meets the Colorado. Lee's Ferry is the eastern entrance to the Paria Canyon that slices forty miles northwest from the Colorado. Canyon walls rise to 1,200 feet. The Grand Canyon is and was once composed of many canyons such as the Black Canyon (now dammed), Glen Canyon (now dammed), and Cataract Canyon. Much of what was seen by the early explorers and Mormon Settlers is now under water.

The Grand Canyon was discovered during expeditions conducted by Don Vasquez de Coronado in 1540. Pedro De Tovar, Anthony, publisher, Beaman, photographer, The Colorado River, from the mouth of Kanab Canyon (Courtesy of Museum of New Mexico) — 1871

Hernando de Alarcon, and Melchior Diaz Subordinates of Coronado were the first to see the Colorado River and the Grand Canyon. In 1776 Father Francisco Tomas Garces climbed into one side of Cataract Canyon and discovered the Havasupai Indians. He also skirted the rim of the Grand Canyon. In 1854 the Grand Canyon was part of the Gadsden Purchase. During 1857 Lieutenant Joseph Christmas Ives was the first to travel up the Colorado River. A steamboat, the U.S.S. Explorer, was built in Philadelphia, dismantled, then shipped to Yuma, Arizona Territory where it was reassembled. The Explorer got as far as Black Canyon where he divided his party sending some members back down the Colorado on the steamer and the rest overland. Ives arrived at Fort Defiance on May 23rd. At the beginning of the trip Ives brought along a wet-plate photographic outfit and a portable darkroom. Because of his inexperience he only succeeded in successfully taking one photograph. Early on, high winds destroyed the photographic outfit and the darkroom tent. Ives did not consider photography very important.

During late May 1869 Major John Wesley Powell and nine adventurous men began their exploration of the Upper Colorado and the Grand Canyon. They started at Green River Station, Wyoming on May 24, 1869. On May 30th they entered Flaming Gorge. On June 8th they entered the Canyon of Lodore. Early in June the rowboat the No Name was wrecked. On June 17th they reached the Yampa River that enters the Green River from the east. On July 21st the party reached the Colorado River. On July 23rd they entered Cataract Canyon; on August 3rd, Glen Canyon; on August 9th, Marble Canyon; on August 13th through August 29th they travelled through the Grand Canyon. On August 30th, 1869 Powell and six men in two boats emerged from the Grand Canyon at the Mormon settlement of Callville, Nevada. Routes similar to this one were travelled by Powell during the 1870's, Brown and Stanton in 1889, and the Kolb Brothers in 1911. In 1857 and from 1871 into the twentieth century, cameras, both stereoscopic and nonstereoscopic were brought along on these expeditions. The Kolb Brothers were the
first to take motion pictures of the Colorado River.

E.O. Beaman was the first to photograph the Grand Canyon. He was hired by Major Powell when he purchased photographic equipment from the commercial supply house of E. and H.T. Anthony Company in New York City. Major Powell expected to derive profit and publicity from the sale of stereographs of the expedition. Income from the sale of stereographs was to be shared by Beaman, Thompson, and Major Powell. William Clement ("Clem") Powell, Major Powell's brother, was to be Beaman's photographic assistant. Beaman took approximately 350 negatives while on the Expedition and was finally released from the survey on January 31, 1872 after Major Powell purchased all of his negatives. Immediately after leaving the Powell Survey Beaman skirted the rim of the Grand Canyon, visited the Hopi Mesa area, and in late summer reached Denver. Later the set of negatives was sold to E. and H. T. Anthony who subsequently published them.

Beaman was succeeded by William Clement Powell, then by James Fennemore, who was Charles R. Savage of Salt Lake City's assistant. Fennemore joined the party at Kanab on March 19, 1872 but resigned on July 19th due to ill health and disinterest in mountain climbing. He took approximately seventy negatives. John K. Hillers who had been Fennemore's assistant succeeded James Fennemore. Hillers was hired in May 1871 in Salt Lake City by Major Powell and Almon Harris Thompson, Powell's brother-in-law and chief topographer. Hillers joined the Powell Survey as a boatman in the "Emma Dean," Major Powell's lead boat. Hillers first learned photography from E. O. Beaman and subsequently served as an assistant to William Clement Powell and James Fennemore. Hillers was an excellent photographer. He took approximately 3,000 negatives of the Colorado River area between 1872 and 1878. Hillers' stereographs were sold wholesale and retail through the J. F. Jarvis Company of Washington, D.C. Income from the stereograph sales was divided between Major Powell, Hillers, and Thompson. Stereographs are on large yellow mounts, approximately five-by-seven inches, with a Jarvis label on the back and on the front sides enclosed in a long orange ribbon printed "U. S. Topographical and Geological Survey of the Colorado River of the West" / "By J. W. Powell and A. H. Thompson."

The U. S. Geographical Surveys West of the One Hundredth Meridian led by Lieutenant George Montague Wheeler began in May of 1871 at Halleck Station, Nevada. The expedition lasted from 1871 to 1875 and photographs were taken in eastern California, Nevada, Arizona Territory, New Mexico, Southern Colorado, and Idaho. Photographs of the Grand Canyon were taken in 1871 and 1872. A different route from the Powell expeditions was taken. The party departed from Camp Mojave, Arizona Territory on September 15, 1871 reaching the Black Canyon on September 22nd. The expedition took thirty-three days and ended at Diamond Creek. Timothy H. O'Sullivan was the photographer on the first survey into the Canyon. O'Sullivan had left Clarence King's U. S. Geological Exploration of the Fortieth Parallel in order to be on the Wheeler Sur-
vey in 1871. He had been on King's Survey of the Fortieth Parallel since 1867 and had been hired by George Wheeler in late September 1870. O'Sullivan rejoined King's Survey of the Fortieth Parallel in April 1872 and was replaced by the Philadelphia photographer William Bell. William Bell is credited with taking the first dry plate photographs of the Grand Canyon, while on the Wheeler Survey in 1872.

Most of the official stereographs bear a War Department imprint that also includes the photographer's identification. This is on the back of the mount. On the front of the mount is imprinted "EXPEDIATION OF 1871 / 1872 or 1873 or 1874 / 1st Lieut. GEO. M. WHEELER, Corps of Engineers Commanding." All views are on four-by-seven inch yellow mounts. These mounts are numbered on the back starting at one (1871) to fifty (1874). There are also some unofficial sub series in existence that are numbered by the negative number. These are scarcer than the official set. Approximately 700 stereographs were produced by the Wheeler Survey from 1871 to 1874 and more than a hundred titles were sold commercially through the publishers J. F. Jarvis and E. and H. T. Anthony between 1872 and 1876. Photographs were taken by O'Sullivan in 1871, 1873, and 1874 and by William Bell in 1872.

In 1889 another river expedition that included a photographer was launched into the Canyon. This was the Brown-Stanton Expedition. The photographic coverage was at first very ambitious as they intended to take photographs in large enough numbers such that it recorded a nearly complete panorama from the mouth of the Green River to the Gulf of California. This detailed coverage was soon considered unnecessary and abandoned. A total of twenty-two thousand negatives were taken, including a number in duplicate and triplicate that yielded close to a thousand separate views. It is not known if any of the photographs taken were stereographs.

The Survey was conducted by the Denver, Colorado Canon, and Pacific Railroad Company and Franklin A. Nims of Denver, both a photographer and a journalist, was chosen to take photographs. The DCC & PRR Company was formed on March 25, 1889 by S. S. Harper, a northern Arizona prospector, who envisioned a railroad line along the Colorado River and did not know about the Powell Expeditions and Frank Mason Brown, a successful Denver real estate businessman who wanted to invest in some sort of scheme. They planned a survey and hoped that there would be a favorable report that would interest a railroad syndicate to finance construction of the railroad. Three days later Frank C. Kendrick, a Denver mining engineer, began a survey of the Grand Colorado River at Grand Junction. His assignment was to record data on the river until he reached the mouth of the Green River in southeastern Utah. From here the main survey party was to begin its operations. Kendrick reached the stated location May 4th. The main survey party of sixteen was led by Frank Mason Brown, president of the DCC & PRR and Robert Brewster Stanton, a civil engineer who had constructed the
Georgetown Loop. They travelled on the Denver & Rio Grande railroad to their point of departure at the Green River Station. On May 25, 1889 the party left the Green River Station.

From the beginning the expedition was plagued with accidents and lost much of their supplies including the destruction of two boats and seriously damaging the others. Early in July the Survey Party reached Marble Canyon. Here President Brown drowned when his boat was upset and a few days later two more men drowned when their boats were upset. Stanton decided that it was time to quit the river, so they climbed out of the Canyon and returned to Denver.

On December 10, 1889, Stanton and a party of twelve men that included Nims with redesigned equipment and improved safety devices were back on the river at the mouth of Crescent Creek near Hite, Utah. On December 25, 1889 the party reached Lee's Ferry. The first serious accident occurred on January 1, 1890 when Franklin A. Nims, while climbing a canyon wall to take a negative lost his footing and fell 22 feet into the Canyon along with three other men. The three men were killed and Nims suffered a broken leg. He was taken by stretcher out of the Canyon and by wagon to the nearest railroad station. When he regained his strength he returned to Denver.

After Nims' departure the leader of the Survey party, Robert Brewster Stanton was made official photographer. The camera that he used was a 6¾ x 8½ Scovil & Adams view camera. As soon as the party reached Peach Springs a telegram was sent to William Henry Jackson of Denver to whom two batches of rolls had been sent for development. Stanton took about sixteen hundred negatives from about the time of the Nims accident until the end of the trip. A telegram from Jackson stated that ninety percent of the photographs were clear and well timed. Four members of the expedition left the survey at Peach Springs. Stanton, six other men, and a new cook emerged from the Grand Canyon on March 17, 1890; reached the tide water at the Gulf of California on April 26th; and reached Yuma on April 30th where the Survey party disbanded.

On September 12, 1909 Julius F. Stone of Columbus, Ohio, left Greenriver, Utah with a party of three men. The purpose was for photographic exploration. The expedition ended at Needles, California on November 19, 1909 with no fatalities and both boats in fine shape. The photographs from this expedition were later published in a book by Stone. On September 8, 1911 Emery and Ellsworth Kolb and James Fagin outfitted at Greenriver, Utah two flat-bottom boats, the "Defiance" and the "Edith." On November 16, 1911 Ellsworth and Emergy reached the foot of Bright Angel Trail. Fagin had left earlier at Lodore Canyon. On December 19th the trip was continued with Hubert R. Lauzon, a park ranger in Grand Canyon National Park, who stayed with them for the rest of the trip. On January 18, 1912 they reached Needles. In May 1913 Ellsworth continued the trip from Needles to the Gulf of California. The Kolbs used a Weno stereoscopic camera and took both cabinet and standard size negatives. Some of the stereographs are more exciting than previous expeditions but the quality

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Wittick negative, "Our Camp-Grub Time," Grand Canyon, c1883 (Courtesy Museum of New Mexico)
is mediocre. This is the only expedition that the Kolb Brothers ever took any stereographs. They did have stereographic slide shows of the expedition for a brief period, but their motion picture of the expedition overshadowed the importance of the stereographs.

Moving on to the South Rim which is the next area where photographic and stereographic coverage is strong in the Grand Canyon. Stereographic coverage begins in the early 1880's when the Canyon was finally made more accessible with the establishment of new trails and improvement of old trails by John Hance and William Wallace Bass who came as prospectors and later found the tourist business more profitable. Hance chose the eastern part of the South Rim, while Bass developed a section far to the west of the present Grand Canyon Village on the South Rim.

The original Hance trail, an improved Havasupai Indian trail, was built on the eastern arm of the Hance Canyon. South of this trail was the Hance Ranch and the Buggeln Hotel. The trail was established during the early 1880's and it went down to the Colorado River. At the top of the trail can be seen a rock formation named the three castles. Midway down the trail was Hance's Rock Cabin where tourists could eat and rest. A mile and a half from the Colorado River tourists had to abandon their horses and mules and climb down a number of cliff walls with the aid of a rope until reaching the bottom of the Canyon. Sometime between 1882 and 1883 J.C. Burge took some of the earliest stereographs of this trail and these are on yellow mounts with his Globe imprint. The original Hance trail was destroyed by a storm in 1895. In 1895 Hance constructed the Red Canyon trail or the New Hance trail which begins at Coronado Butte, crosses a tributary below Moran Point, and slopes down into the bed of Red Canyon. The trail leads to asbestos mines at the bottom of the Canyon.

The Grand View trail was built by Pete Berry about 1892 to copper mines that had been found at the base of Horseshoe Mesa. Before the construction of the El Tovar Hotel in 1904 the Grand View Hotel stood near the beginning of the Grand View trail. Stagecoaches brought tourists from Flagstaff to this area in a single day. During the late 1890's a railroad was constructed at the present area where Grand Canyon Village now stands. These are the earliest trails constructed on the South Rim and are the principal trails used by tourists and photographers.

In the early 1880's the main route to the South Rim of the Grand Canyon was by taking a stagecoach from Williams to Peach Springs, then following a trail through Spring Valley to the Grand Canyon, by following the Colorado River to the junction of Diamond River. George Benjamin Wittick followed this route during the summer of 1883 when he went on a photographic expedition to the Grand Canyon. He did take stereographs on this tour. During the mid-1880's William Wallace Bass constructed a stage route from Williams to the South Rim of the Grand Canyon. In May 1892 a tri-weekly stage line was permanently established between Flagstaff and the Grand Canyon. During the late 1890's a railroad was constructed from Williams to Grand Canyon Village and completed during the early 1900's. All of these developments made the South Rim more accessible to photographers.

Stereographic coverage of the South Rim is spotty until about 1903. During the early 1880's George Benjamin Wittick of Albuquerque and J.C. Burge of Globe (c.1882-1884) and Flagstaff (1884-1885) were the most frequent stereographers in the area. On one trip during August 1885 Burge and Wittick travelled to the Hopi Mesas and then visited the South Rim.
Henry G. Peabody of Boston is known to have stereographed the South Rim during the 1890's. He returned to the Grand Canyon in 1928 and took stereographs of interiors and exteriors of cabins and lodges at Grand Canyon Village for the Keystone View Company. The Kolb Brothers did take some stereographs of the South Rim between 1900 and 1911, because these are mentioned in Emery Kolb's stereopticon narrative written around 1911. The Kolb's gallery is located near Grand Canyon Village on the South Rim. Between 1901 and 1903 Underwood began sending staff photographers to the South Rim of the Grand Canyon. Views are on gray mounts and in addition to the usual panoramas and trail stereographs there are also stereographs of celebrities such as Theodore Roosevelt visiting the Grand Canyon. H.C. White sent staff photographers to the South Rim between 1905 and 1906. Stereographs are on gray and deluxe black mounts with gold lettering. White's stereographs are magnificent. The American Stereoscopic Company of New York also sent a staff photographer to the Canyon around 1900. In 1925 Keystone View Company sent Phil Brigandi to the South Rim. Stereographs are of Grand Canyon Village and along the route of the Hermit Creek Trail. Keystone also reprinted some of Underwood's earlier stereographs of the South Rim. Most views of the South Rim published by Keystone View Company during the 1920's are of El Tovar Hotel and adjoining structures. Stereographs by Keystone View Company of the South Rim were published as early as the teens and as late as the 1930's. Keystone took the only stereographs of the Grand Canyon after it became a National Park in 1919.

There are a few stereographs of the North Rim. Most are of Toroweap Outlook and these were taken by Hillers during the Powell Surveys of the 1870's. Another photographer who visited the Grand Canyon during the 1870's was Charles R. Savage of Salt Lake City. I have one stereograph in my collection of Black Canyon. These stereographs are on standard and cabinet size light green mounts. In addition to stereographers, hundreds of photographers visited the Grand Canyon from the 1870's onward, including George Wharton James, Frederic Hamner Maude, William Henry Jackson, (1892), Karl Moon, Edward A. St. Clair (Flagstaff), Calvin Osbon (Flagstaff), L. C. McClure (Denver) and Charles Fletcher Lummis.

Sources
Fowler, Don D. "Photographed All the Best Scenery": Jack Hillers' Diary of the Powell Expeditions, 1871-1875. Salt Lake City: University of Utah Press, 1972.

VIEWMASTER
(Continued from page 13)

All of these changes are minor and have not affected the quality of the reels produced nor the number of titles available. View-Master intends to release several new story titles in the next few months. These include Beetlejuice, Teenage Mutant Ninja Turtles, Dick Tracy and several others.

A new product for the 1990s is the addition of View-Master reel albums. These albums will include six story reels and be available in two story styles-Disney and Sesame Street. The design is similar to a limited production release of reel packages done about six years ago but is different in that the new album opens up and holds 18 reels. The purpose of the album is to keep several sets of VM reels together.

Tyco intends to continue to market the View-Master line to retailers across the country such as K-Mart and Toys-R-Us. Sales to Toys-R-Us, alone, accounted for 15% of View-Master's net sales in 1988 and, with the advent of the Mickey Viewer, this figure should grow considerably higher in the next few years.

It appears that the success of the Mickey Viewer is all that View-Master hoped it would be and more. Other Disney character viewers have been discussed and other licensors are interested in developing viewers using their own characters.

Scenic titles will continue to be sold at various sites across the country, although cost factors have necessitated the end of the two-reel scenic packet. As most are aware, the one-reel Scenic America titles have been discontinued for some time now.

Perhaps the "invasion" of the View-Master plant by stereo fanatics during the recent Portland NSA Convention will indicate to Tyco management that adults love View-Masters as much as children (if not more) and that this market should not be overlooked.

Our thanks to retired View-Master employee David Hitchcock for his help with the packet illustrations for this column.
Information regarding the hunting oriented scene at the top of page 37 in our July/August, '89 column has come to us from Bob Cauthen. He possesses parts of two related series, some dated 1904 and some 1906. Almost all of the views are hunting scenes, although one shows a train somewhere on the prairies. Overall, the images are quite good and suggest a professional or advanced amateur status for the photographer. On the verso of most of the cards there is an oval shaped and inked imprint stating “Please Return to Watson P. Phillips.” This could relate to the photographer although it may be more likely the name of the owner of the set(s).

As to location, the views were taken at various localities in the Northwest. Thanks for the information, Bob!

At the bottom of the same page of that issue, the mystery view of a railroad town has been identified as Truckee, Ca. by fellow Californians Mead Kibbey and Jim Crain. The view shows #7680 from E. & H.T. Anthony's tradelist, "View from Truckee Station, Looking West." Jim further points out that the Anthony firm sent photographer Thomas C. Roche west in 1870 to make negatives along the newly completed transcontinental railroad lines as well as in that marvelous valley called Yosemite. Assuming Roche traveled by train, this may well be one of his first views taken within the boundaries of California. One further note: the "sea of conical... tents" alluded to in the text of that earlier article have turned out to be nothing more than the white painted fronts of wooden buildings in the main part of town. Thanks for your help, Mead and Jim!

This issue’s first two selections are actually the front and back of the same home. Both images are mounted on the familiar lavender/orange stock and are from the collection of P.M. Nosek who was once informed that they may show the home of U.S. Grant in Galena, Ill. One of you Grant enthusiasts may be able to quickly corroborate or refute this assertion. The house is all brick with very ornate block work around the tops of the elongated windows and beneath the eaves of the roof. Three chimneys are visible and two sections of iron railing accentuate the roofline. Three men and three women patiently wait on the porch at the main entrance to the house while the photographer plies his trade. Flanking the steps to that porch and atop the lowest hand-railing post are two busts that at first appear to be a very unusual architectural feature. The small stairway at the rear of the house shows a similar figurehead. Closer examination of the second image, however, reveals that these busts have been merely set there for the photograph. In that view, the front staircase can be seen from a different and not so prominent angle and the busts are missing. The one on the back porch railing may even be one of the ones shown earlier on the front. Magnification suggests the models may be of Lincoln and Washington although this is too uncertain to state with any degree of finality. Any further information on the house or the “disappearing busts” would be appreciated.

Our last two views for this issue were submitted by Robert Wilson. The first shows what is a small hotel. Built in two sections, the structure sports three dormer windows, three interior chimneys, wooden siding, and a full-length balcony along the second and uppermost story. Well-dressed guests line that balcony and the yard below. One young man shows off a bit by standing on
his head a short distance in front of
the camera’s location. On the back
of the cream/yellow oversized
mount is the handwritten inscrip-
tion “[St. Johns] (?) Hotel, Pullat-
thur(?)”. Could this possibly be a St.
Johns Hotel along the river of the
same name at Palatka, Florida? The
roadway and other bare areas ap-
pear to be quite sandy, thus giving
credence to the idea that this view
may be from a southern and/or
coastal region. Any help?

Lastly, we come to a view taken
by D.A. Cline whose stamped im-
print on the verso of the green
mount states he operated from the
Holmes’ Block in Lincoln, Nebras-
ka. In the background, there is a
commercial district of some brick
and some wooden buildings running
the entire width of the camera lens’
range. All buildings in this particu-
lar area are facing the camera but
none support any helpful signs. The
large, unidentified, stone building in
the foreground, the object of the
photographer, is still undergoing
construction. There is a fence pro-
tecting a workyard that must be a
full block in size and plenty of
building materials are scattered
about the workyard inside. A work-
man’s ladder rests near the center of
the mansard style roof. And the
windows are odd, misshapen, and
only temporarily set, probably
meant simply to allow the passage
of light until the correct windows
could be obtained and installed.
Guesses for a usage for the building
might range from a hospital to a school to a government function. Could the building still stand somewhere in Lincoln today and what have its uses been?

Robert also sent along a view showing the interior of a cavern which has not been reproduced here. The sole identification on the card is the full back imprint which reads "Sittler's Views: Along the Line of the Kansas City, Springfield & Memphis Railroad, View of..."

Views can be had at Sittler's St. Louis Street Gallery, either Stero (sic) or 8 x 10." Darrah's sourcebook lists a G.-W. Sittler at Shelbyville, Indiana and a Sittler & Lunney firm at Shelbyville, Illinois. Is there a St. Louis Street in either of these locations or was there another Sittler (or possibly one of the same) operating at another location, possibly St. Louis? Is anyone familiar with the name and location of any caverns along the line of this railroad that may have been well enough known then to attract a commercial photographer? And while we're at it, are the Sittler-Shelbyville connections purely coincidental or possibly a cataloging error in Darrah's listings?

Send information about these or other past Unknowns to Dave Klein, 14416 Harrisville Rd., Mt. Airy, MD 21771. Please do not send any views for the time being because we have a good backlog to draw upon.

ARCHIVAL SLEEVES: clear 2.5 mil Polypropylene

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Russell Norton, P.O. Box 1070, New Haven, CT 06504-1070
SHIPPING: $4 per order. Institutional billing.
As a follow-up to the report in the September/October Stereo World report on this camera, your Newviews Editor David Starkman has obtained a Fed Stereo Camera through David Burder of London, England. We have both had a chance to shoot some test rolls, and provide this joint report.

First, a rundown of the technical specifications:

- **Name:** Fed Stereo (Cyrillic lettering on camera)
- **Place of Manufacture:** Somewhere in the U.S.S.R.
- **Serial No. of test Camera:** 900098 (or 8600067)
- **Film type:** Standard 35mm
- **Image Size:** 24.1mm x 30mm (same as Verascope & Belplasca)
- **Camera Size:** 7"L x 3" H x 1 7/8" D (175 x 80 x 50 mm)
- **Weight:** 1 pound 8 ounces (650 grams)
- **Body Color:** Black with black leather grain trim
- **Lenses:** 38 mm F:2.8 "Industar 8", non-interchangeable
- **Focus:** 1 meter to infinity (scale and zone symbols)
- **Film Advance:** Standard lever type alternating 1 & 3 strokes
- **Construction:** Die cast metal with some plastic trim
- **Exposure:**
  - **A** = Fully Automatic (no viewfinder information)
  - **B** = Bulb at F:2.8 only
  - **F:2.8 to F:16 manually adjustable at 1/25th only
- **ASA/ISO Range:** 16/25 to 800

- **Auto Exposure Range:** 1/25 - F:2.8 to 1/500 - F:16 (ASA 100)
- **No double exposure capability**
- **Lens separation approximately 63.5mm**
- **Standard hot-shoe for X-synch flash. Flash will not fire in Auto mode, so outdoor fill flash is not possible**
- **Self-cocking shutter (when film is advanced)**
- **No hinge on camera back (falls off Belplasca style)**
- **Left hand film gate notched for identification**
- **Battery is common PX 625 or equivalent**
- **No battery check, but shutter will not fire on Auto if there is not enough power**
- **There is no light level check, but shutter will not fire on Auto if there is insufficient light for the film speed selected.**

Actual-size sequence of frames from Fed camera. (Stereos by David Starkman.)

Our general impression is that the camera is more than we expected, but less than the ideal that we would want.

On the positive side is a general good solid feel and design. The feeling is that of an updated Belplasca, due mainly to the modern touches of having a standard flash hot shoe, a wind lever (instead of a knob) rewind crank, and Auto exposure. Small things to ask for, but not found on stereo cameras of the
1950's. The seven sprocket format is a very pleasing and sensible one for stereo, and is compatible with already existing mounts and view- ers. The lenses seem to be sharp and of good quality, free of flare, and the Auto exposure seems adequate for slide film. The ergonomic hand grip is a nice feature, and gives the camera a good feel while tripping the shutter button. All functions feel smooth and solid in operation.

exposure was consistent, but about a stop underexposed. This could be compensated for in the ASA dial setting. Very minor is that the film counter dial was set in just a little off, so that only half of the frame number was consistently visible.

Both David Burder and I feel that it is a shame that this was not designed to take two full-frame 24 x 36mm images, (with a "normal") 65mm base retained through the use

On the negative side our test camera had a few minor defects. There was a 0.2mm vertical differ- ence in the right and left images, which is easily compensated for in the Albion mounts, but might re- quire some trim adjustment in the EMDE European masks. The Auto of a TDC Stereo Vivid-style film roller) and that more manual con- trol is not possible, such as a match- needle exposure system. Fill flash and double exposure capability would also be desirable.

Our final conclusion is that the camera is generally a delight to handle and use, and gives excellent stereo results. It easily provides a more modern and better alternative to anyone using a 1950's vintage camera and who would like the ad- vantage of auto exposure, and a wider-than-Stereo-Realist format.

This conclusion assumes that the camera works reliably. Both David Burder and I ran 3 rolls of film each through the camera with no mechanical problems or failures. The smooth mechanical feel of everything would lead one to hope that it is a reliable instrument, but only time and testing will tell.

We have not been able to get our hands on a sample of the new size Russian stereo mounts, or the "ETUD" stereo projector. Also there has been no hint of any type of hand viewer as a companion to the outfit.

At the time of this writing, price and availability remain the final question. Numerous letters and phone calls have not been able to track down a factory source or representative. It appears likely that at least some limited quantity is, or will be, in production, but it is impossible to speculate when the camera might become available, or what the selling price will be. We will certainly report to Newviews on any further developments.

The illustrated book Stereo Cameras Since 1930 was reviewed in these pages some time ago, but it is a useful enough reference work (now with text in English) that a reminder is in order. Dr. Werner Weiser has assembled front, top, and open back photos (flat but large) of each of 69 stereo cameras made since 1930. With each page of photos are complete technical details and a descriptive paragraph on the particular camera. Included are all models of each brand, all names which may have appeared on the same design, and some cameras which existed only as prototypes. Cameras from the Contura to the Realist, from the Puck to the Leep, and from the Sputnik to the Nimslo are covered.

Even the Homeos and the EHO are included, although they predate the 1930 title date. Only the most recent Nishika, Trilogy and Fed missed being included—along with the various European spliced SLRs. The book is available for $29.00 (including shipping) via interna- tional money order from Dr. Werner Weiser, Seigelberg 57, 5600 Wuppertal 23, Fed. Rep. of Germany. (Phone 202-611787.)
Black Hole 3-D

Released late last year, the first computer game to employ the Pulfrich 3-D effect is called Beyond the Black Hole, from The Software Toolworks. The game features 35 different 3-D levels requiring the solution of different puzzles in order to advance. Proper directional movements are maintained throughout the game by the program so that star fields and game elements are always in correct 3-D relationships and in logical size and perspective.

Besides being ideal for computer generated images, the Pulfrich effect requires only simple glasses with one dark lens, so no extra hardware is needed for 3-D viewing—and viewing without the glasses provides a perfectly normal looking image. Besides the game, the introductory sequence itself includes an impressive display of truly stereoscopic computer graphics. Perhaps the biggest surprise of all is the 36 page booklet included with the game and illustrated with anaglyphic stereo photos and drawings. Rather than promoting the game or the company's other products, The History and Lore of 3-D covers stereo imaging from da Vinci to Wheatstone to Holmes to 3-D comics, movies and TV. (There is also, of course, a chapter on the Pulfrich effect.) For an extra inserted in the box with a game, this small book packs more stereo history than any other publication of its size. Better yet, it includes a paragraph on the NSA and Stereo World.

Beyond the Black Hole requires IBM PC, XT, AT, PS/2, Tandy & compatibles, CGA (4 color), EGA/VGA (16 color) and Tandy (16 color). 512K memory. (Mouse or joystick optional but more fun.) The game is available in many computer stores, and by now should be available for the Commodore 64/128. Also, it is to be released under the name Orbit as a Nintendo game! For details or sources, contact The Software Toolworks, 19808 Nordhoff Place, Chatsworth, CA 91311.

Test Report: The RBT Stereo Projector

Since August 1989 we have been testing the RBT Stereo Projector from West Germany. This is the name of the production model of the Oehmichen Stereo Projector which we have reported on earlier, and which had several prototypes in use at the ISU Congresses in Switzerland and W. Germany.

The projector is a fully automatic stereo projector for "Stereo Realist" and "European" format stereo slide mounts with outside dimensions of 1 5/8" x 4" (41mm x 101mm). Features include a custom 50 slide one piece molded plastic slide tray, remote forward and reverse slide changing, and individual autofocus for the right and left slides with remote override. It also has an incredibly bright modern halogen optical system with a wide choice of modern and fast multi-coated German projection lenses. The only features that are not automatic or remotely controlled are the vertical and horizontal adjustments. The makers assume that precision slide mounting will be used, and have not accommodated for any laziness in slide mounting by the user.

The RBT projector with its covered slide tray in place.
Susan Pinsky and I have been using the projector extensively, in preparation for a slide program to be given at the Stereoscopic Society in Bournemouth, England. We have found that, while it has some limits to be aware of, the projector is a pleasure to use, once slide mount compatibility and mounting are properly dealt with.

Slide mount compatibility seems to be the biggest problem. Oehmichen has designed a snap-together 2-piece plastic slide mount with adjustable sprocket rails that allow for easy horizontal adjustment—and up to .4mm vertical adjustment. They are as thick as EMDE glass mounts (about 3mm), although they are glassless. They work perfectly in the RBT projector, and with the autofocus feature the fact that they are glassless makes no difference for projected sharpness.

With all other slide mounts, such as those which are popularly used in the USA, the problem is that the slides will not drop into the projector 100% of the time. In our first test with EMDE glass mounted slides in aluminum frames (8%) of 50 in the tray would not drop into the projector. With repeated testing we found that it was basically the same slides that would not drop in each case. The solution was to put new aluminum binders on the problem slides, being very careful to get a neat fold on the fold-close end of the binder frame. Once this was done we were able to achieve 100% success. For the program that we have been working on this had involved many repeated projections to weed out problem slides, but the end result is worth it to be able to project by just pushing a button!

We would also not recommend using this projector for programs mixing glassed and non-glassed slides. This is because in setup you must first manually focus the lenses while the autofocus is turned on (it may be turned off if desired). If the slide you have focused on is a glass slide, all subsequent glass slides will automatically be in focus. If the first slide is a glassless slide, all subsequent non-glassed slides will be in focus. But with mixed slides one or the other will not come into focus, and will require manual override every time. For mixed types of slides it might be best to turn off the autofocus feature and focus by manual remote control for all slides.

Use of the EMDE masks with the EMDE mask frames (No. 2400) appeared promising until the wrapped around edge of one of the mask frames caught in the slide gate while inside the projector. The only way to get it out was to open the projector while the slide tray was still in position. We discovered that the aluminum slide tray guide rails press so tightly against the projector housing that there is almost no room to lift the cover open. We were only able to do this with a bit of force, but without any damage to the projector. We suggested that the design of the projector cover should be changed to allow opening with the slide trays and guide rails still in position—in the case of an emergency slide jam. Alternatively, there could be some sort of switch that would allow removal of the tray while a slide is jammed in the slide gate. We understand that RBT is planning to do something in this regard.

We did discover the source of the problem is that the wrap-around edge of the mask frame caught on the slide positioning solenoid pressure plates. The problem can easily be overcome by mounting the masks into the mask frames so that the SMOOTH side of the frame faces the FRONT of the projector, which also means that the smooth side will face the pressure plates.

We had good success with the use of the EMDE masks in our Stock No. 2130 Universal Foldovers. These
worked most of the time, with just one or two of 50 not dropping into position.

We also had the same success with the Stock No. 4600 cardboard heat seal stereo mounts. Just one or two of the 50 slides would not drop. I had precision mounted into the heat-seal mounts, and it was a real pleasure to not have to make any adjustments as each one popped into sharp auto-focus. Even if a slide "pops" from heat during projection it will immediately re-focus (individually for right and left!).

It is mildly disappointing that we were not able to get 100% of the slides to drop properly, as is possible with the plastic RBT Stereo Slide mounts, but the numerous advantages of the projector make it worth doing some re-mounting to get 100% success.

We also found that we seemed to get a bit more 'ghosting' than we were used to with the older TDC style projector. I first thought that the polarizer in the projector was not as good as the material we sell in the USA, so I removed the polarizers, located between the condensers and the slide. Polarization appeared just a little bit less efficient than my replacements, but once I installed new polarizers in the projector the difference was not noticeable.

My conclusion is that the extra ghosting is partly due to more depolarization by the newer multi-coated projection lenses, and partly due to the fact that the projector is simply brighter, therefore ghosting is stronger. As of this writing I have not experimented with polarizers in a new location, but I have found that precision mounting with the main subject superimposed usually makes for a good stereo window, and keeps ghosting to a minimum.

Technical specifications are as follows:

- An automatic stereo projector for 41mm x 101mm (1 5/8\" x 4\") size stereo slides with apertures from Nimslo size (16mm x 24mm) up to a slightly reduced full frame (33mm x 24mm).
- Slide change is from a straight 50 slide tray, by gravity feed, with solenoids providing positive film gate registration.
- Slide change time is about 1 second, with fade out and fade in of lamps during slide change.
- Forward and reverse slide change by remote control.
- Auto focus may be overridden by remote control, with remote focus of right or left lens only, or in unison.
- Optical system uses coated condensers and 250W / 24V halogen lamps.
- Projection lenses available in 60mm/2.8, 90mm/2.4 and 150mm/3.5. The "normal" and most economical lens is the 90mm f/2.4 Multi-Coated Isco V/S Proja—a 5 element lens in the class of the Leitz Colorplan.
- Power supply is changeable for 110, 220 or 240 Volts, 50 or 60 Hz. Power consumption is 600 Watts.
- Weight is about 23 pounds (10.5 Kilos) with compact dimensions of about 14.5\" x 10\" x 5\" (365 x 260 x 145 mm) width, depth and height.

Other accessories include a carrying case and infrared wireless remote control. There is also an accessory outlet so that 2 RBT projectors can be controlled by a dissolve unit, and sound tape synchronization can be done by connection through the remote control outlet.

The price for all of this technology (and limited production) does not come cheap! Expect approximately DM 3,000 for the projector without lenses. This does not include shipping, freight and insurance. In U.S. Dollars this means you'd better be prepared to spend about $2,000.

For more information or ordering write to the manufacturer: RBT Raumbildtechnik GmbH, Karlstrasse 19, D-7307 Aichwald 4, W. Germany. Tel: 02331-804292.

This column depends on readers for information. (We don't know everything!) Send information or questions to David Starkman, P.O. Box 2368, Culver City, CA 90231.

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**Holography for Photographers**

If you enjoy creating stereo wonders to amaze friends and family in your own darkroom, you may also have thought about holography as the next logical (or utterly mad) step in your visual explorations. If so, the book to get started with may be *Holography for Photographers*, written by five alumni of Chicago's School of Holography especially for people who already have darkrooms. The book explains how to set up your own holography lab for under $1000, including exactly what to buy and where to buy it.

While lacking the table diagrams of other texts, the 42 page book does cover the basics of single and multiple-beam transmission and reflection holograms. The authors claim this as the first hands-on instruction book on holography "for an audience that is already half-way there—photographers." In that sense, stereographers must be three-quarters of the way there.


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**A Q-VU of Forever**

Q-VU self-framing stereo print mounts are now also available in an archival, acid-free stock. In addition, the backs of the mounts feature a large white area for subject notes, technical notes and date. Lighter weight than regular Q-VUs, the archival mounts are made of acid-free, 90lb., 100% cotton cover stock. They are available only in "Keystone Grey," but in all three styles; arched top windows, flat tops with rounded upper corners, and the X style with wider septum and narrower windows. (See July/Aug. '87, page 23.)

For a sample kit and Q-VU details, send $5 to Q-VU, 817 E. 8th St., Holtville, CA 92250.
The Stereoscopic Society was formed many years ago so that viewmakers could enjoy each other's work and exchange tips and criticisms for the improvement of the craft. It remains true to that prime objective today. Originating in England in 1893, its activities suffered interruption during the first world war. The American Branch was organized in 1919 and has been in continuous operation ever since. Although no longer officially tied to the Stereoscopic Society in England, correspondence and exchange of transparency-format stereo views maintain the longtime relationship which is augmented by visits among members from time to time.

Interest in making stereo views continues on the increase if one can judge by the steady growth which the Society is experiencing in the United States and Canada. We have had to create a third circuit for transparencies mounted in Realist format and expect it to be well along by the end of 1990. The other two circuits are at or near the 30 member limit which allows a folio box to visit each member once during a calendar year, on the average, as it travels the circuit on its never ending journey. Each member removes his/her old view from the box, along with the comments written by the other members, adds a new one in its place and sends it on to the next name on the route list. Enough boxes are in circulation so that folios arrive approximately at one month intervals.

For those who like to make stereo views in 2×2 matched pair 35mm format, we originated a separate folio circuit in the late fall of 1988 and it now has about 20 members. They are a vigorous and enthusiastic group who are having a lot of fun and learning much from each other. It encompasses both experienced and novice viewmakers, which can ensure its health for some time to come. Of course, some have to drop out or become inactive from time to time for various reasons but are more than offset by new applicants. So a steady growth has occurred and is continuing.

The print circuit circulates stereo views in standard viewcard format (prints mounted on a 3½ × 7" mount). Some people do their own darkroom work, either black and white or color. The majority, however, work with color prints and have their work done by commercial processors. There are several labs which cater to stereographers and most of the prints are processed at these labs. The mounting is done by the members many of whom are aided by using the popular and attractive Q-VU mounts. The amateur (or novice) viewcard maker can be driven to distraction (or worse, discouragement) by color print services whose expensive, automatic equipment seems incapable of being accurately focused and which cannot seem to produce matched prints (in exposure or color balance) from stereo matched negatives... or for that matter even the same negative twice. But these problems can be resolved and the print circuit members are more than happy to aid and assist each other, and especially to help new members. Growth in the print A young and energetic Dizzy 'Bop' Gillespie was captured in stereo at the Island Garden Jazz Festival at West Hempstead, NY, during the 4-day jazz concert in July of 1958. The photographer was NSA and Society member Bob Rebholz of Copiague, NY. (See Sept./Oct. '89, page 35.) Gillespie, now a matured living legend, says that his trademark bent horn was originally the result of an accident. But he could hear himself play better and decided to stay with the altered configuration.
circuit has been steady and some division of the membership, however unpopular, seems inevitable.

There is a lot of activity in mixing or transferring formats and current technology is aiding these options. It is quite feasible now to go from color print negatives to transparencies in good quality. Likewise one can go from color transparency to print format in either color or B&W, but one must be warned that commercial labs seldom do this very well as it requires patience and attention to detail to get good quality results and few commercial labs indeed deal in either of these virtues. Anything that involves black and white prints really must be done by oneself. Commercial processors grossly overcharge for B&W and so far as I have seen their skills in B&W darkroom techniques are no better than novice level on their best days. Exceptions being few and far between. But B&W is still with us and has its advocates, especially among those who do their own processing. For Society members, all of this means that it is easier to participate in more than one format and double the fun.

All in all, it is a great time to be a stereographer (perforce an amateur one) and the Stereoscopic Society is where one can enjoy it to the utmost. Those interested in Society membership should write to the "Corresponding Secretary, Jack E. Cavendar, 1677 Dorsey Avenue, Suite C, East Point, GA 30344."
A Simple Turntable for Small Object Stereo

by Dr. Dale E. Hammerschmidt

Stereoscopic photography of small objects poses a number of technical problems. A conventional stereo camera, such as the RealistTM, may be used for modest close-up photography with the addition of plus lenses with a bit of base-in prism; however, proper alignment is tricky and unacceptable hyperstereo effect—with excessive background discordance—is often achieved. Alignment and focus problems may be less severe with a twin-camera set-up, but hyperstereo effect is even more pronounced unless very long focal lengths are used. Specialty stereo close-up cameras, such as the Macro-RealistTM are hard to find, and quite pricey when found. The close spacing of the NIMSLO's lenses may be exploited for close-up work (as by using plus lenses and the center two lenses), and close-up lenses are available for the Teco-NIMSLOTM—but again, alignment may be quite tricky.

When the object to be photographed is a stationary one, a useful trick may be to photograph it once, then rotate it a bit, and photograph it again. This is often used for mineral samples or molecular structure mock-ups; Bill Patterson has recently treated both the print and the (2x2)x2 folio circuits of the Stereoscopic Society to a lovely example: a series consisting of pairs of scanning electron micrographs of insects, rotated $\approx 3.5^\circ$ between scans! In the less exotic "macro" use of this technique, the lighting is usually not perfectly identical between the two images, resulting in noticeable differences in shadows and a pair that's a bit uncomfortable to fuse (mindful of stereo views of the moon at other than full phase [See Bonney, W. H.: Journey into the deep sky. Stereo World 15{3}: 24-30, (Jul./Aug.)1988]). This problem may be overcome if one arranges for the principal light sources to rotate with the object, a goal achieved by the simple and inexpensive jig described below.

The heart of this jig is a Lazy Susan; you may build your own with readily-available Lazy Susan bearings. Several sizes are also available inexpensively from the Weston Bowl Mill, of Weston, Vermont; in the accompanying photos, I've used their 12-inch-diameter, $\$11.50 model. A piece of quite inexpensive ($3.88 for 8 feet) hobbyist's $\frac{1}{8}\text{"}-\text{by-}\frac{5}{8}\text{"}$ aluminum bar is used to fashion light and reflector brackets; a few 1/4-x-20 (tripod-thread) machine screws, a few threaded inserts, a bit of black felt and some odds and ends from the photo junk box (or Spiratone or Porter's, if you're less of a pack-rat than I) complete the project. If you wish to commit a pair of low-power strobes and slaves to the turntable exclusively, the completed project will cost about $100; if you have the strobes and slaves on hand for other uses, it will cost about $50 (See Table ); if you already own a radio or infrared slave trigger, the tab will be less than $30.

Construction

Identify the center of the Lazy Susan platform, and scribe two lines through it, intersecting at $\approx 120^\circ$ is a convenient choice for most work, but is not critical; scribe additional lines parallel to these lines, and 11/32" on either side of them. Using a router with a simple cylindrical bit, rout to a depth of 5/32" the areas shown in Figure 1; drill a 5/16" hole through the very center (for a centering post if you wish to use one).

Then cut a strip of 1/8"x-5/8" hobbyist's aluminum bar stock to a length of 34"; scribe for bends and mark for holes, drill them and countersink as indicated in Figure 2. Cut a second strip to $\approx 24"$; cut one end off at a 60° angle instead of square; scribe for bends and mark for holes as indicated in Figure 2; again, drill the indicated holes; be careful that you countersink on the correct side of the bar (you may

Figure 1. The top surface of the 12-inch Lazy Susan, showing the areas to be routed to accommodate the aluminum bars/light brackets.
9/32" holes to accommodate 1/4"-x-20 machine screws

Score lines for 45° bends

Countersunk holes to accommodate #8 x 3/4" flathead woodscrews

1/4" hole, threaded to 1/4"-x-20, for centering post, if desired

Countersunk hole to accommodate #8 x 3/4" flathead woodscrew

Score line for 45° bend

9/32" hole to accommodate 1/4"-x-20 machine screw

Figure 2. The spacing of the holes and bends in the two pieces of aluminum bar stock.

Figure 3. A photograph of the basic turntable, after the channels have been routed (somewhat inexpertly, but the felt will cover that!) and the bracket bars have been affixed.

even want to wait until you check the alignment, to avoid embarrassment and harsh language). Then drill the holes and tap (1/4"-x-20tpi) the center hole of the 34" bar. (Tapping the hole allows you to use a piece of 1/4"-x-20tpi threaded rod as a centering post, or to make object platforms which screw into place to assure their proper centering.)

Now lay the 34" bar in the routed full-diameter channel, aligning the tapped center hole in the bar (A) with the 5/16" hole in the center of the top. The scribe marks for the bends should now align reasonably closely with the edges of the top. Mark the location of the countersunk holes (B); drill the appropriate pilot holes. Using a vice or brake, begin the bends at the scribe marks; secure the bar to the Lazy Susan top with 8-x-3/4" flathead wood screws. Similarly, lay the shorter bar in the half-diameter routed channel, making sure that the 60° cut abuts reasonably closely to the secured longer bar. Again, the scribed mark for the bend should be close to the turntable's edge. Again, mark for and drill pilot holes, initiate the bend, and secure the bar to the top with 8-x-3/4" flathead wood screws.

Complete the bends to about 45°; depending on the size and shape of objects you're likely to photograph, you may find a slightly different angle to be more advantageous. (See Figure 3)

The device is now basically complete; the following steps carry this skeleton to a functional unit in the manner I have done for my prototype.

Cover the Lazy Susan top with a matte, light-absorbing surface, such as felt in a dark color. It's also handy to make a distance scale on the edge of the Lazy Susan top, to allow you to note and reproduce displacements which work out well for you. A 12" circle—like the Lazy

### Table 1: Turntable Parts List

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Item Description</th>
<th>Source</th>
<th>Catalogue #</th>
<th>Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turntable</td>
<td>1</td>
<td>DLS-2</td>
<td>$11.50</td>
<td>$11.50</td>
</tr>
<tr>
<td>1</td>
<td>8-foot length 1/8&quot; by 5/8&quot; hobbyist's aluminum bar</td>
<td>2</td>
<td></td>
<td>$3.88</td>
<td>$3.88</td>
</tr>
<tr>
<td>2</td>
<td>Tilt flash brackets</td>
<td>3</td>
<td>13-7002</td>
<td>$3.99</td>
<td>$7.98</td>
</tr>
<tr>
<td>2</td>
<td>Small, low-power strobes (e.g. Agfa SS or SS-II)</td>
<td>4</td>
<td>p. 27.</td>
<td>$6.95</td>
<td>$17.90</td>
</tr>
<tr>
<td>2</td>
<td>Mini-slaves (IR sensitive)</td>
<td>4</td>
<td>Ibidem</td>
<td>$19.95</td>
<td>$39.90</td>
</tr>
<tr>
<td>1</td>
<td>IR-filtered strobe (e.g. Vivitar 1900RT)</td>
<td>3</td>
<td>13-0345</td>
<td>$23.95</td>
<td>$23.95</td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot;x20 tpi, 1/2&quot; machine screws</td>
<td>2</td>
<td></td>
<td>$0.08</td>
<td>$0.24</td>
</tr>
<tr>
<td>4</td>
<td>#8 x 5/8&quot; flathead wood screws</td>
<td>2</td>
<td></td>
<td>$0.08</td>
<td>$0.32</td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot; x 20 tpi nuts</td>
<td>2</td>
<td></td>
<td>$0.02</td>
<td>$0.06</td>
</tr>
<tr>
<td>1</td>
<td>Bulldog clip</td>
<td>2</td>
<td></td>
<td>$0.25</td>
<td>$0.25</td>
</tr>
<tr>
<td>9</td>
<td>1/4&quot; machine screw washers</td>
<td>2</td>
<td></td>
<td>$0.03</td>
<td>$0.27</td>
</tr>
<tr>
<td>1</td>
<td>12&quot; square hobbyist's self-adhesive felt</td>
<td>2</td>
<td></td>
<td>$1.75</td>
<td>$1.75</td>
</tr>
</tbody>
</table>

Total Cost for Materials (If you already have slaves, small strobes) $50.20

Total Cost for Materials (If you have your own) $108.00

Sources:
1. Weston Bowl Mill, Main Street, Weston, Vermont 05161
2. Friendly neighborhood hardware store
3. Porter's Camera Store, P.O. Box 628, Cedar Falls, Iowa 50613-9986
4. Freestyle Sales, 5124 Sunset Blvd., Los Angeles, California 90027
Figure 4. A close-up of the degree scale I affixed to the turntable's edge. This was made with my small computer, and simply glued in place. In the foreground, a small hole may be seen. I generally use the turntable on a stool to which the device may be affixed; this hole provides a reference point for measuring rotation against the scale.

Susan top I’ve chosen—has a circumference of 37.699 inches; so one degree is a wee squeak greater than 1/10 inch. (See Figure 4) Using the holes (A) near the ends of the long bars, use 1/4-x-20tpi machine screws to attach photo accessory shoes. A variety of models are available for under $5 from places like Porter’s and Spiratone. Obviously, one with a tripod socket should be chosen, for ease of attachment: also obviously, one with an adjustable angle of tilt is handy.

Using the similar hole at the end of the short arm (D), attach a “Bull-dog” or similar clamp, which may be used to hold a light-reflecting card for back-fill when the two main lights give too flat an effect.

Using the jig

Place a small, non-automatic strobe in each accessory shoe of the device. Notice that the jig now falls over, because the light arms make dandy levers and the turntable itself isn’t very heavy! Rethink the issue, and place a weight on the turntable or affix its base to something solid—I first used a brick to weight the table, then added two threaded inserts to the underside (allowing me to bolt it easily to a wooden kitchen stool). Equip the strobes with slaves, or with hard-wire connectors to the camera—a slave system has the advantage that it avoids the risk that traction on the wires will accidentally move the turntable. It is important that the great majority of light for the exposure come from these two strobes; significant other light may “queer” the shadows in the final image. There should not be a strobe on camera, unless it is infrared-filtered, or an underpowered “blinker” used solely as a slave trigger (and providing less illumination than the on-turntable strobes by two “stops” or more). Position the jig so that the background will be relatively homogeneous, and far enough beyond the depth-of-field range to be very homogeneous in the photographic image you make. Place the object to be photographed in the center of the jig, using the center hole as a marker; adjust its position as desired relative to the lights; ingenuity may be required! If you have a flash meter, a reading will help narrow the range in which you have to bracket exposure; if not, simply estimate the exposure from the strobe’s guide numbers, and bracket ±2 stops the first time you

Angular Displacements and their Approximate Base-to-Distance Ratio and Linear Displacement Equivalents

<table>
<thead>
<tr>
<th>Rotational Angle, in degrees:</th>
<th>Tangent of angle: (=base/dist.)</th>
<th>distance:base (= 1/tan)</th>
<th>Slide-bar Equivalent base at dist. = 20 cm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.146</td>
<td>0.020</td>
<td>50</td>
<td>2.5 mm</td>
</tr>
<tr>
<td>1.432</td>
<td>0.025</td>
<td>40</td>
<td>5.0 mm</td>
</tr>
<tr>
<td>1.500</td>
<td>0.0262</td>
<td>38.2</td>
<td>5.24 mm</td>
</tr>
<tr>
<td>1.909</td>
<td>0.0333</td>
<td>30</td>
<td>6.667 mm</td>
</tr>
<tr>
<td>2.000</td>
<td>0.0349</td>
<td>28.7</td>
<td>6.98 mm</td>
</tr>
<tr>
<td>2.291</td>
<td>0.0400</td>
<td>25</td>
<td>8.0 mm</td>
</tr>
<tr>
<td>2.500</td>
<td>0.0437</td>
<td>22.9</td>
<td>8.74 mm</td>
</tr>
<tr>
<td>2.862</td>
<td>0.0500</td>
<td>20</td>
<td>1.0 cm</td>
</tr>
<tr>
<td>3.000</td>
<td>0.0524</td>
<td>19.1</td>
<td>1.05 cm</td>
</tr>
<tr>
<td>3.500</td>
<td>0.0612</td>
<td>16.3</td>
<td>1.22 cm</td>
</tr>
<tr>
<td>3.814</td>
<td>0.0667</td>
<td>15</td>
<td>1.33 cm</td>
</tr>
<tr>
<td>4.000</td>
<td>0.0699</td>
<td>14.3</td>
<td>1.4 cm</td>
</tr>
</tbody>
</table>

A commonly recommended stereo “base” is 1/30th the distance to the closest object (range 1/15th to 1/50th). If convergent visual axes are assumed, the base:distance ratio is very close to the tangent of the convergence angle.* As can be seen from this table, a 3.5° angle corresponds to a ratio of 1:16.3, at the hyperstereo end of the recommended range. This would be similar in stereo effect to a slide-bar view at a distance of 20 cm (7.87 in.), with a separation of 1.22 cm (just under 1/2 inch).

The table provides values for “round” numbers of degrees and for “round” distance-to-base ratios in the 15-50 range.

(Angle is actually = 2 • arctan([base/dist.]+2), error about 0.1% in the range of interest.)

Figure 5. The turntable jig in use. In front of a seamless paper backdrop, the jig is positioned on a stool. An SLR is on a tripod off-turntable, with a close-focusing 135mm lens and an IR strobe slave trigger. The strobes on the jig’s arms are low-power Agfa 55-II units, which are diffused by cloth overbags.
Figure 6. An example of a stereocard made with the “Hammerschmidt Jig;” this is my 1989 stereo Christmas card.

try the jig.

Have an ordinary single-lens-reflex camera on a tripod off-turntable, with a macro lens or with extension tubes or close-up lenses (and of course with the slave trigger or synch. cords in place) Bring it into the \( \approx 120^\circ \) angle between the light arms, until the desired composition is achieved. Take the first exposure (bracketing as necessary). Now rotate the turntable the desired amount, and take an additional exposure (again bracketing as necessary). The most satisfactory angle is remarkably consistent at about 3-to-3.5\(^\circ\). Larger angular displacements may give excellent stereo effect, but be less comfortable to merge (even though normal interocular distance at the edge of the turntable would be about 24\(^\circ\)—but note the severe background discordance when you view your own thumb at close range; it wouldn't make a good stereocard!) (See Table ).

Example

Figure 5 shows the fully set-up jig, in the process of photographing a wax casting; in fact, this is in preparation of my 1989 stereo Christmas card. This being a tricky object to set up, I placed it in a large plastic drinking glass, and put plastic foam packing peanuts around it to hold it gently in place. I put small cloth bags—made of old handkerchiefs—over the two strobes to soften their light; I used Agfa SS-II (GN-64 @ ISO-100) strobes and tripped them with a Vivitar 1900RT infrared trigger and Wiens slaves; the Vivitar trigger is simply an infrared-filtered small strobe, which passes very little visible light but produces a sharp enough peak of infrared light to trip most slaves. I bracketed both exposure and angular displacement, and liked the 3.5\(^\circ\) and 4\(^\circ\) results best. (At 7.5\(^\circ\) the image was “hyper” enough that the Virgin Mary seemed to be pitching the Infant Jesus through the stereo “window” at the observer—not quite the effect I was seeking!). I used color negative film, mounted the resultant prints as stereocards in Q-Vu mounts, and had them reproduced in quantity as “Type R” prints (Figure 6); I also had the negatives printed out onto unmasked color negative film (Vericolor 5072), and mounted the resultant positives as Realist-format slides.
Miscellaneous Technical Comments

The most successful results are obtained when the visual axis of the camera intersects the axis of turntable rotation at a right angle—that is, when the turntable is level, the camera is level and aimed horizontally, and the center of the turntable axis is near the middle of the image (Figure 7A). This will yield a conventionally-proper stereo “window,” square to both the camera’s visual axis and to the object, without noticeable vertical parallax between the images. In contrast, if the axis of the turntable and the visual axis of the camera are more than \(\approx 10^\circ\) from perpendicular (the camera is inclined upward or downward relative to the turntable) (as in Figure 7B), a noticeable vertical parallax will be introduced; this is negligible near the center of the image, and greatest at the edges. Such an image pair may still be successfully mounted, if one takes great care that the parallax “errors” are exactly offsetting, which will be the case if the axis of turntable rotation projects as precisely vertical in both “chips.” The result will be a pair in which the “window” is square to the visual axis of the camera (and now the viewer), but is oblique to the vertical plane of the object pictured. The brain is generally up to this challenge, and such images can readily and comfortably be fused.

Many of the design features of this turntable jig are purely arbitrary, and it can readily be modified to allow greater flexibility or to meet specific needs. Two possibilities come immediately to mind: (a) Using gooseneck light supports or adding wing-nut joints to rigid supports of the type I’ve shown, to allow greater flexibility in light positioning; (b) Using variable-output strobes, to make it easier to have greater texture through uneven lighting. The important concepts are that the lights move with the subject, and that they provide the vast majority of illumination for the subject.

This turntable jig is, for obvious reasons, inappropriate to the photography of English Springer Spaniels and Giant Sequoias.
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June 9, 10  (GA) Atlanta Camera Show & Sale, Sheraton Atlanta-Airport, Atlanta, GA. Contact Photorama USA, 20219 Mack Ave., Grosse Pointe Woods, MI 48236. Call 313-884-2243.

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June 10  (CA) Culver City Camera Show & Sale, Veterans Memorial Auditorium, Culver City, CA. Contact Anton at Bargain Camera Trade Shows, Box 5352, Santa Monica, CA 90405. Call 213-396-9463.

June 16  (IN) Indianapolis Photorama USA, Indianapolis Armory, Indianapolis, IN. Contact Photorama USA, 20219 Mack Ave., Grosse Pointe Woods, MI 48236. Call 313-884-2243.

June 16, 17  (CA) Oakland Camera Show, Scottish Rite Auditorium, Oakland, CA. Contact G. Lash, 231 Market Place, Ste. 379, San Ramon, CA 94583. Call 415-828-1797.

June 17  (IL) Chicagoland's Camera & Photo Show, Holiday Inn, Rolling Meadows, IL. Contact Box 72695, Roselle, IL 60172. Call 708-894-2406.

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