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The South African War *1899 - 1902*

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By Neal DuBrey

Stereograms of the South African War provide a useful photographic record of events and their background. They are one of the largest and most comprehensive series of photographs of the period and, whilst fast disappearing, are by no means rare.

By the turn of the century, one publisher alone was producing 30,000 stereogram cards per day.

This publisher was Underwood and Underwood, based in America but active also in many other countries. The young Underwood brothers, still in their early twenties, had conceived the idea of using college students as part-time door-to-door salesmen, to endorse by their prepared manner and speech the educational value of the product. This was an idea later to be done to death in the merchandising of encyclopedias, but when new to the public it sold stereo views by the million. The Underwoods searched continually for new subjects.

This point in time, this grand flowering of stereoscopy, happened to coincide with the South African War. A few stereograms had been made of the American Civil War, there had been one or two series portraying other minor affrays. The clear skies and the photogenic quality of the terrain, together with the general distantness of events to most viewers in Europe and America, made these pictures of the South African War a great success.

Underwood and Underwood issued their South African War stereograms either loose or in boxed sets. These boxes were ingeniously constructed and bound to resemble books, and were titled "The South African War through the Stereoscope". Two boxfulls made a set of one hundred and fifty "views", now worth about one hundred dollars in America, where there are a few collectors specialising in historical stereos.

As new titles were added, so were older ones dropped. This means that many more than one hundred and fifty titles were actually issued, and that no two "complete" boxed sets found today are likely to be identical. It was usual to sequence the cards at the time of boxing by embossing a number, but such embossed numbers are not an identification. The same number can appear on many different titles.

An interesting point is that all Underwood stereo negatives were sold to Keystone in 1912, who re-issued a number of the South African titles after that date under their own catalogue numbers. These Keystone reissues are generally of good photographic quality with good black tones, the sepia finish of the original Underwoods having tended to fade towards yellow over the years.

The Underwoods were unusual among stereo publishers of the period in seldom printing the name of the photographer under the caption. Pictures taken by their own photographers, several of whom came to South Africa, cannot be distinguished

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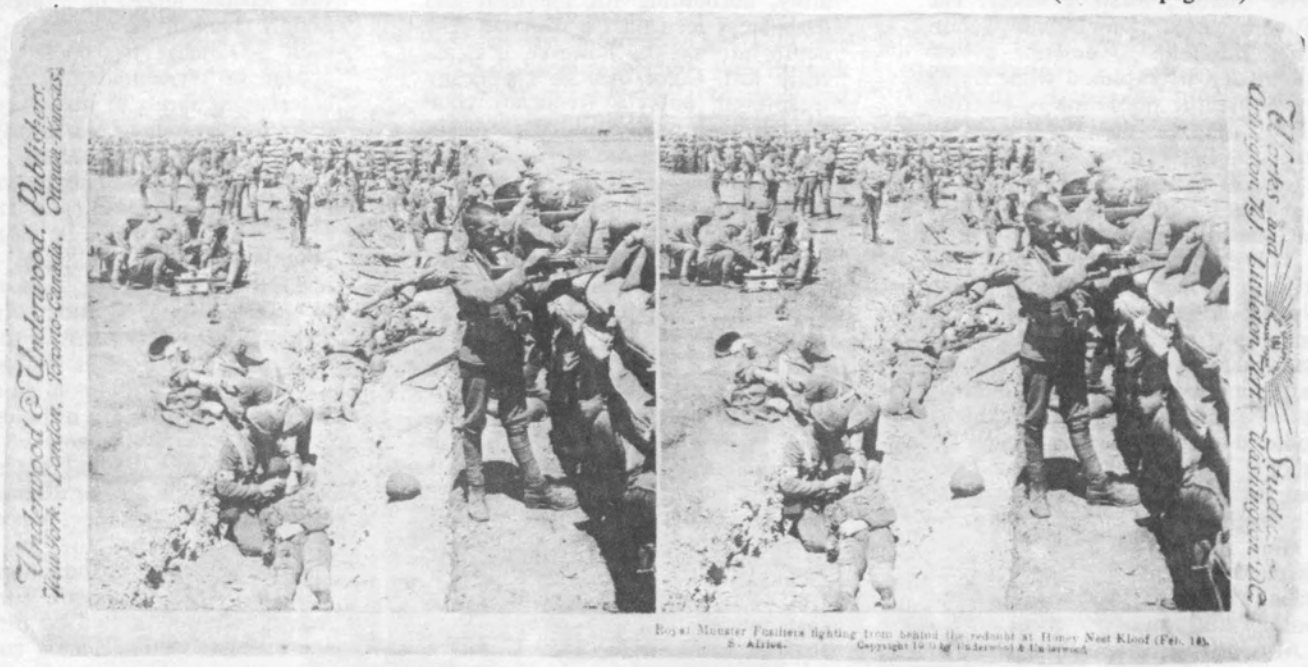

Royal Munster Fusiliers fighting from behind the redoubt at Honey Nest Kloof (Feb. 16). S. Africa. Copyright 1900 by Underwood & Underwood. (John Waldsmith Collection).

HOLOGRAPHY *An Overview*

By Brandt Rowles

Holography is a photographic process as unusual and amazing to modern man as the first glass stereoscopic slides must have been to an untutored rustic. As with stereoscopic photography of the 1850's, holography is toddling through its infancy. However, as holography matures, it will include a much broader range of uses and applications.

Looking at a standard hologram is exactly like observing an object through a small window. The person looking at the holographic plate (window) will see objects appear behind it at the same distance at which they were originally photographed. As one moves his head in front of the window and changes his viewing angles, the objects change their position and perspective exactly as they would if they were really there. The holographic picture, thus, has true depth and parallax. Imagine looking at a 3-D picture of a Christmas tree and observing Santa Claus appear from behind it as you change your viewing angle! While our mutual hobby of stereoscopy provides flat images that fool the brain with an illusion of depth, holography provides the real thing – true 3-D images, viewable at many angles.

This article will provide a brief overview of the history, basic theory, varieties, source of supply, relative cost and a few present and future applications of holography.

The term "holography" means "the whole picture" and is derived from the Greek "holos", meaning whole. The British scientist, Dr. Dennis Gabor, coined the term to describe a new process that he explored while trying to improve the resolution of electron microscopy. His discovery, a novel method of recording reconstructed wavefronts of light, was first published in **Nature, 161**, 777 (1948). Many years ahead of its time, the principle of holography languished until the early 1960's and the development of a coherent source of light called the laser (**L**ight **A**mplification by **S**imulated **E**mission of **R**adiation). It was at that time that two University of Michigan scientists, Leith and Upatnieks, produced 3-D holograms using Dr. Gabor's principles and a gas laser. Their work sparked an intense period of scientific interest which continues to this day. Holography has been described as a technological marvel rivaling the very discovery of the photographic process.

Although holography may be considered to be a special type of photography, there are some very basic differences. While the traditional convex lenses used in photography are used in holography, they serve only as laser beam spreaders, and are not required. The hologram is recorded on a very fine grain photographic emulsion, but the holographic images on the film show up as an apparently incoherent series of fine lines and smears. No "picture" will appear until the pattern is decoded with a proper light source. A very strange fact about a hologram is that every part of the emulsion contains coded information to reproduce the whole (holos) picture. Cutting a hologram in half will produce two smaller, but complete, pictures of somewhat reduced resolution and clarity. Further cutting of the hologram will result in smaller whole pictures. The objects still appear, in toto, behind smaller windows. To view a standard hologram, a source of coherent light is necessary to recreate the original object-reflected light wavefront from the diffraction patterns on the photographic emulsion. The 3-D images then appear to be behind, rather than on, the emulsion. Truly, this is unusual photography!

The ordinary photographic process only records part of the light wavefront information that the photographed object sends to the film. Ordinary white light is composed of amplitudes (intensities) and frequencies (wavelengths, phases) and it may be compared to the march of a differently clad, disorganized, heterogeneous and fractious army. The photographic emulsion will record the amplitudes (areas of intensity) of the army, accounting for the light and dark areas seen on the negative. The depth information, however, is essentially lost. Color may be chemically recaptured, but the frequency component is essentially not recorded. The lack of coherence of the wave-front army is manifest by individual waves being variously out of phase, or step, and by lines or areas of bright or dark where waves augment or cancel each other out. Such variables are nearly infinite and cannot be recorded on contemporary film. The result is that traditional photography loses frequency (depth) response and photographs are not three-dimensional. Indeed, the retina of the eye is little better than film at recording depth messages from an object-reflected light wavefront. The brain creates "depth" by receiving and integrating simultaneous images from the slightly separated eyes. It is by this same process that we are able to perceive depth from stereoscopic pictures. Thus it is seen that traditional processes of photography cannot capture true depth, as the frequencies of the reflected wave-

about $6.00 each. A filter allowing the use of a slide projector as the light source is available for about $1.00. I believe that this represents an inexpensive opportunity for the stereo hobbiest to obtain samples for his collection. (One of the most interesting holograms offered is that of a magnifying glass placed partially in front of a watch. Changing viewing angles results in according changes of magnified sections of the watch – an amazing sensation!) If one were to become especially interested in this field, there is progressively more sophisticated viewing equipment available, to a price of about $100.

Holograms other than transmission holograms are outside the financial interests of most collectors, and may run upwards of $7,000, including specialized viewing equipment. One of the most interesting varieties is the suspended (projection) hologram, where a 3-D transparent image is projected in mid-air. To see one of these eerie images bouncing about in a room is strongly reminiscent of the visions of Ebeneezer Scrooge or of our childhood conceptions of ghosts. One is tempted to purchase projection hologram equipment and go into the medium business, using holographic images to conjure up real money from real people.

Using cylindrical holograms, a 360^{o} view of an object may be created. The resulting product is more similar to a statue than a photograph. Color holograms are available, as well as changing-image holograms, featuring multiple separate images on a single plate. Simply changing viewing angles causes each 3-D image to appear and disappear in mysterious fashion. Such entertaining facets of holograms have been used by commerical displayers to draw attention to their wares.

The obvious entertainment value of holography, however, pales in comparision with its scientific values. Its potential is just beginning to be realized and there seems to be no limit to its scientific applications. As holography is extremely sensitive to movement or deformation, it may be used to detect stress patterns in an object. There is even a variety of holography called acoustical holography, where coherent sound waves, rather than laser light, are used. For example, the tire industry has made reference holograms of undisturbed tires and superimposed holograms of those tires made under set stress conditions. The interference patterns formed on the hologram clearly outlined areas and patterns of stress and weakness. The applications of such non-destructive

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