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Arthur B. Evans

Optograms and Fiction: Photo in a Dead Man's Eye

They looked. Murderer's ground. It passed darkly. Shuttered, tenantless, unweeded garden. Whole place gone to hell. Wrongfully condemned. Murder. The murderer's image in the eye of the murdered. They love reading about it.

—James Joyce, *Ulysses* (§6:205)

One of Jules Verne's later *Voyages Extraordinaires* titled *Les Frères Kip* (The Kip Brothers, 1902) features in its conclusion a somewhat curious scientific concept—yet one which was quite popular during the latter half of the nineteenth century and the early years of the twentieth: the notion that the image of the last thing seen at the moment of death remains imprinted upon the retina of the eye.

The fictional setting in Verne's novel where this theory comes into play is as follows:

A certain Captain Harry Gibson of the English freighter *James Cook* has been stabbed to death. On the strength of circumstantial evidence, two brothers named Karl and Pieter Kip are promptly arrested and imprisoned for the crime. Photos of the dead body are taken; in particular, snapshots of the victim's head (with eyes open). An acquaintance of the victim asks the photographer for an enlargement of the head photo as a memento of his dead friend. The photographer agrees and makes several copies of the portrait, giving one to the victim's family as well. Upon seeing the enlarged photo of his slain father, the young Nat Gibson is seized with grief and bends over to kiss it—and suddenly discerns two small points of light in the eyes of the photo. He examines these with a strong magnifying glass and discovers therein the faces of the real murderers: two villainous sailors from the *James Cook* whom the police had initially suspected but against whom no hard evidence could be found. The real culprits are now arrested and condemned; the Kip brothers are vindicated; and the novel concludes with Justice served and the status quo happily reestablished.

In his final chapter, Verne (always the pedagogue) explains to the reader the "scientific" basis for this pivotal discovery:

For some time now it has been known—as a result of various interesting ophthalmological experiments done by certain ingenious scientists, authoritative observers that they are—that the image of exterior objects imprinted upon the retina of the eye are conserved there indefinitely. The organ of vision contains a particular substance, retinal purple, on which is imprinted in their exact form these images. They have even been perfectly reconstituted when the eye, after death, is removed and soaked in an alum bath. (§16:556)

It is likely that Verne gleaned this tidbit of ocular physiology from any one of the various newspapers, scientific journals, or encyclopedias available to

him in *fin-de-siècle* France—like the *Gazette Médicale*, for example, or the *L'Encyclopédie française d'ophtalmologie* by Lagrange and Valude—which offer detailed descriptions of this phenomenon (the latter of which, in particular, bears some resemblance to Verne's own).¹

Whatever the case, the experiments leading up to this scientific discovery were relatively well-known during Verne's time. The following is a brief summary of them by the noted biochemist George Wald (winner of the Nobel Prize for Medicine in 1967) in his article called "Eye and Camera":

In 1876 Franz Boll of the University of Rome discovered in the rods of the frog retina a brilliant red pigment. This bleached in the light and was resynthesized in the dark, and so fulfilled the elementary requirements of a visual pigment. He called this substance visual red; later it was renamed visual purple or rhodopsin. This pigment marks the point of attack by light on the rods: the absorption of light by rhodopsin initiates the train of reactions that end in rod vision.

Boll had scarcely announced his discovery when Willy Kühne, professor of physiology at Heidelberg, took up the study of rhodopsin, and in one extraordinary year learned almost everything about it that was known until recently. In his first paper on retinal chemistry Kühne said: "Bound together with the pigment epithelium, the retina behaves not merely like a photographic plate, but like an entire photographic workshop, in which the workman continually renews the plate by laying on new light-sensitive material, while simultaneously erasing the old image."

Kühne saw at once that, with this pigment which bleaches in the light, it might be possible to take a picture with the living eye. He set about devising methods for carrying out such a process, and succeeded after many discouraging failures. He called the process *optography* and its products *optograms*.

One of Kühne's early optograms was made as follows. An albino rabbit was fastened with its head facing a barred window. From this position the rabbit could see only a gray and clouded sky. The animal's head was covered for several minutes with a cloth to adapt its eyes to the dark, that is to let rhodopsin accumulate in its rods. Then the animal was exposed for three minutes to the light. It was immediately decapitated, the eye removed and cut open along the equator, and the rear half of the eyeball containing the retina laid in a solution of alum for fixation. The next day Kühne saw, printed upon the retina in bleached and unaltered rhodopsin, a picture of the window with the clear pattern of its bars. (563-64)

Franz Boll reported his findings on rhodopsin to the Berlin Academy on November 12, 1876. Willy Kühne's optographic experiments were presented to the Naturhistorisch-Medizinischen of Heidelberg on January 5, 1877 and they were later published in the 1877 and 1878 issues of the *Untersuchungen aus dem Physiologischen Institut der Universität Heidelberg*. English translations of these articles appeared in England in 1878 in Michael Foster's *On the Photochemistry of the Retina and on Visual Purple*.² Subsequently, Boll's and Kühne's discoveries were featured in a variety of newspapers and international journals offering "current events" columns on science like *Fortnightly*, *Nature*, *Athenaeum*, and the *Nineteenth Century* in England, the *Musée des Familles*, *Les Merveilles de la Science*, *Année scientifique et*

industrielle, and the *Revue des Deux Mondes* in France, and in American periodicals like *Harper's Weekly*, *Scientific American*, and *The Chautauquan*.

Undoubtedly, the rapid technological advances made in (and the growing popularity of) photography throughout this period also served to highlight these discoveries and to introduce them into public awareness.³ After all, the lesson seemed simple and very straightforward: the retina functioned like the photographic plate of a camera, therefore the final image viewed before death should remain fixed forever—like a photo—within the dead person's eyes. It also came to be believed (as a logical extension of this hypothesis) that if death were to occur at a moment when the pupils of the eyes were hugely dilated—e.g., because of fear, surprise, anger or some other strong emotion—the retinal optograms of the deceased would be even clearer, more detailed, and easier to “develop.”⁴

Popular belief in these “facts” became so widespread during the final decades of the nineteenth century and the beginning of the twentieth that some police departments began to take close-up photographs of the eyes of murder victims in the hope of identifying their murderers. The most celebrated of such cases involved Scotland Yard's investigation of the infamous Jack-the-Ripper murders in Whitehall, London in 1888. One historian, in describing these events, notes:

In an attempt to be scientific, the police pried open Annie Chapman's dead eyes and photographed them, in the hope that the retinas had retained an image of the last thing she saw. But no images were found. (Stewart-Gordon 121)

And another adds:

The comparatively new science of forensic photography was called upon, and scene-of-crime photographs were admitted in evidence. ...

Later, the curious ritual of photographing the victim's eyes had been carried out. There was a theory that was to last well into the first quarter of the twentieth century that in cases of violent death the last images were fixed permanently to the retina of the eye. A photograph taken when the eye had been drawn a little way out of the socket could thus, it was believed, identify the killer.

It was nonsense, of course, but it was a superstition that reached right into our own century... (Sharkey 83-4).

Murderers, in their turn, sometimes destroyed the eyes of their victims for fear that their image might be recorded therein. The case involving the murder of a certain Constable P.C. Gutteridge in England in 1927 was one of many such instances. As described by Richard Harrison in his book *Scotland Yard*:

In the early hours of September 27, 1927, occurred a crime that shocked England with its brutality...

In the very act of doing his duty Constable P.C. Gutteridge of the Essex constabulary was shot down. He was found by the roadside with four bullet wounds in his head, each fired from a distance of about ten inches. A shot had been fired through each eye, and it was believed by some at the time that the murderer had done this out of superstition. There is an old belief that a picture of the murderer is imprinted in the victim's eyes. (§5:74).

And in Brussels, in 1955, a court condemned to death two men who murdered the wife of one so that the other's daughter could then marry him. The remaining wife, a conspirator in the crime, was given three years in prison because she had "sewn the head-cape which was to prevent the victim from seeing her assassin and conserving his image on the retina of her eyes..." (Bornecque 62, n.1).

Finally, it would seem that this belief—at least in some sectors of the population—continues to persist even today. Witness, for example, the following article appearing in the August 1992 *Reader's Digest* about the Russian mafia in New York City:

Police often found themselves powerless to intervene. Few refugee-immigrants dared to report crimes, much less identify those responsible. Reprisals, even against family members, could be brutal. In one instance, the wife of a man who had crossed rival gangsters was stabbed to death. Then, in keeping with an ancient Russian custom, the killer gouged out her eyes in the belief that his image would be recorded in them. (Adams 34-5)

Or consider the February 22, 1993 television broadcast of the NBC *Today* show, where an American author is being interviewed about his newly-published book on a notorious Russian serial killer:

BRYANT GUMBEL, co-host: When the Soviet Union fell, one of the most frightening stories to emerge was that of Andrei Chikatilo, the most savage serial killer in history. In all, Chikatilo murdered, mutilated, and cannibalized more than 50 women and children in a dozen years in and around the town of Rostov. Issa Kostoev, a special investigator, spent five years stalking Chikatilo, finally helping to bring him into custody in November of 1990 and gaining a full and gruesome confession nine days later when Chikatilo admitted to at least 52 murders—there were probably more. The murders, the manhunt, and confession are all detailed in *Hunting the Devil* by Richard Lourie....

RICHARD LOURIE: He would gouge out the eyes of his victims. He hated eyes and genitals. That was part of his mania. And then there's a Russian superstition that the last thing that the victim sees, which is the image of the murderer, is imprinted on the eyes of the dying victim.⁵

Accordingly, in the light of such news items, it seems no exaggeration to assert that this particular belief has, for well over a century, continued to remain deeply rooted in the popular imagination.

Jules Verne was neither the first or last writer to use (or misuse) this piece of "scientific" data in his fiction. But he was one of the first⁶ to incorporate it realistically—that is to say, without unduly spiritualizing it with metaphysics, twisting it to serve an ideological message, or extrapolating it into futuristic high-tech brain-scans.

The first literary work, to my knowledge, to use optograms was by the *décadent* French author Villiers de l'Isle-Adam in his short story "Claire Lenoir" (first published in 1867, later expanded into his 1887 novel called *Tribulat Bonhomet*)—a narrative described by Huysmans as having been "obviously derived from the tales of Edgar Poe."⁷ With a satiric intent, Villiers portrays a self-assured positivist doctor called Tribulat Bonhomet who sets out to visit an old friend named Césaire Lenoir and his wife Claire

near Saint-Malo. En route, he befriends a young English naval lieutenant named Henry Clifton who has recently had a brief affair with a married woman whose description seems strangely similar to that of Claire Lenoir. Dr Bonhommet and Henry Clifton part company; the former to spend a few weeks visiting the Lenoirs, while the latter ships out to the South Seas to cure himself of his ill-fated love. Bonhommet arrives in Saint-Malo, pauses to rest in a local café, and discovers a strange article in a newspaper which someone has left behind:

I took up a newspaper that lay on the table—a local paper, dirty, torn, dated I know not how long ago....

As I turned over the pages I saw a short article, inserted between a case of intrusion on the part of the Clergy and some recent recipe, which ran:

"L'Académie des Sciences de Paris has stated the authenticity of certain surprising facts. It can be asserted that the animals destined to our nourishment—such as sheep, lambs, horses and cats, conserve in their eyes, after the butcher's death stroke, the impression of the objects they have seen before they die. It is a photograph of pavements, stalls, gutters, of vague figures, among which one almost always distinguishes that of the man who has slaughtered them; this endures until their decomposition. As one sees, our ignorance in this matter ought to be lessened by so curious a discovery." (§4:42)

Later that day, settled in at the Lenoir residence, Bonhommet and his hosts have lengthy philosophical discussions about life, death, reality, afterlife, and the nature of the soul. Césaire Lenoir suddenly falls ill. Just before his death, he somehow learns of his wife's infidelity, and he swears vengeance on his rival in the hereafter. One year later, Bonhommet and the widow Claire Lenoir meet. She is now on her deathbed, driven there by guilt and by persistent nightmares about her deceased husband who is standing in an exotic land, dressed as a bloodthirsty savage, and awaiting the arrival of his fated victim. Bonhommet is shocked: a few days earlier, he had received word that Henry Clifton had been brutally murdered, beheaded in Polynesia by a particularly ferocious member of a tribe of cannibals! The widow Lenoir then expires. Noticing a blurry image remaining in her eyes, Bonhommet examines them with the aid of his ophthalmoscope and discovers therein a horrific sight:

In examining the eyes of the dead woman, I saw, distinctly, at first detach itself, as a frame, the stripe of violet paper that encircled the top of the wall. And, in this frame, reverberated in this fashion, I perceived a picture which no language, dead or alive...could, under the sun and under the moon, express in its unimaginable horror. ...

I saw the skies, the far-off floods, a great rock, the night and the stars! And upright, on the rock, larger in height than the living, a man, like one of the natives of the Dangerous Sea, stood. Was he a man, this ghost? He lifted with one hand, towards the abyss, a bloody head, with dripping hair. With such a howl as I have never heard, but the horror of which I divined in the ignivomous distention of the hugely opened mouth, he seemed to devote himself to the destructiveness of shadow and space. In his other hand that hung, he held a stone cutlass, disgusting and red. Around him, the horizon seemed to me endless—the solitude for ever accursed! And, under the expression of a

supernatural fury, under the spasm of vengeance, of solemn wrath and of hate, I recognized instantly on the face of the Ottysor-Vampire, his *inexpressible resemblance to Césaire Lenoir* before his death and, in the severed head, the features, frightfully obscured, of the young man I had known, Sir Henry Clifton, the lost lieutenant!

Stumbling, arms extended, shivering like a child, I recoiled.

My reason fled from me: hideous, confused conjectures maddened and stupefied me. I was no more than a living chaos of anguish, a human rag, a brain as withered as chalk, pulverized under the immense menace! And Science, the old queen-sovereign with clear eyes, with perhaps too disinterested a logic, with her infamous embrace, sneered in my ear that she was not, she also, more than a lure of the Unknown that spies on us and waits for us—inexorable, implacable! (§20:219-22)⁸

The first reference to optograms quoted here (read in a newspaper by Bonhommet) is anecdotal and authoritatively scientific. It foreshadows and sets the stage for the second (witnessed by Bonhommet) which is spiritualistic and heavy with metaphysical implications. And, considered together, the author's narrative strategy becomes very apparent. Villiers, an avowed anti-science idealist and firm believer in the supernatural, has prepared and sprung a trap on his pompous anti-hero Bonhommet. This deathbed hallucination imprinted in Claire Lenoir's eyes—this "photo" of her vision—is well beyond the power of Science to explain. Yet it exists. Faced with this reality, Doctor Bonhommet's entire value system is abruptly shaken to its roots, reducing him to "a living chaos of anguish." And it is important to note that the story concludes at this point—Bonhommet is purposefully left hanging in existential crisis. His plight thus represents a dramatic consummation of his creator's satiric purpose, a kind of literary vengeance by Villiers on the hated philosophy of Positivism. It is obvious that Villiers' use of retinal images in "Claire Lenoir," brimming with irony and mysticism, stands in marked contrast to Verne's later more conservative portrayal. Villiers' approach, polemical rather than expository, is tailored to send a strong ideological message: that Science is wholly incapable of understanding the higher planes of human consciousness and the true nature of the universe.⁹

Another such "metaphysical" portrayal of optographic images occurs in Rudyard Kipling's 1891 short story titled "At the End of the Passage" (included in his collection *Life's Handicap*). The fictional setting is India during the 1880s. In the searing summer heat of India's provinces, three British civil servants get together every Sunday to play whist at the home of one of their countrymen, a certain Doctor Spurstow. One of them, Hummil, complains of sleepless nights and bad dreams. The following week, he is found dead in his bed with a look of horror frozen upon his face. Doctor Spurstow examines the dead man and, noticing gray blurs in the pupils of his eyes, decides to photograph them for later study. Although the cause of his death remains uncertain, Hummil is buried. After the burial, his friends continue to wonder about how he died:

After breakfast, they smoked a pipe in silence to the memory of the dead. Then Spurstow said absently—

"Tisn't in medical science."

"What?"

"Things in a dead man's eye."

"For goodness' sake leave that horror alone!" said Lowndes. "I've seen a native die of pure fright when a tiger chivied him. I know what killed Hummil."

"The deuce you do! I'm going to try to see." And the doctor retreated into the bath-room with a Kodak camera. After a few minutes there was the sound of something being hammered to pieces, and he emerged, very white indeed.

"Have you got a picture?" said Mottram. "What does the thing look like?"

"It was impossible, of course. You needn't look, Mottram. I've torn up the films. There was nothing there. It was impossible."

"That," said Lowndes very distinctly, watching the shaking hand striving to relight the pipe, "is a damned lie."

Mottram laughed uneasily. "Spurstow's right," he said. "We're all in such a state now that we'd believe anything. For pity's sake let's try to be rational."

There was no further speech for a long time. The hot wind whistled without, and the dry trees sobbed. Presently the daily train, winking brass, burnished steel, and spouting steam, pulled up panting in the intense glare. "We'd better go on that," said Spurstow. "Go back to work. I've written my certificate. We can't do any more good here, and work'll keep our wits together. Come on."

No one moved. It is not pleasant to face railway journeys at mid-day in June. Spurstow gathered up his hat and whip, and, turning in the doorway, said—

"There may be Heaven; there must be Hell.

Meantime, there is our life here. We-ell?"

Neither Mottram nor Lowndes had any answer to the question. (265-69)

Kipling's narrative suddenly ends at this point. The "things" in the dead man's eyes are never explained nor even described in detail. The reader is told only of the Doctor's horror when viewing the developed photographs and his immediate destruction of them. But, once again, the metaphysical implications of these photographic images—as astounding as they are understated in this story—cannot be denied: just as in Villiers' "Claire Lenoir" (which may well have served as Kipling's intertextual model), Hummil witnessed an "impossible" vision which terrified him and caused his death. And this nightmarish hallucination left its physical imprint upon the retinas of his dead eyes—either from within or, even more inexplicably, from without (having somehow become corporeal and exteriorized). Doctor Spurstow's initial reactions—similar to Doctor Bonhomet's—are disbelief, shock, and fear. But, unlike the fate of Villiers' protagonist, Kipling's character is allowed to overcome his crisis. Adopting a kind of Voltairian "cultivate one's garden" attitude, Spurstow suggests that they all simply "Go back to work" because "work'll keep our wits together." And it is now the reader who is left hanging—and wondering . . .

Yet another unrealistic use of this scientific concept—this time twisting it to serve the needs of racist propaganda—occurs in Thomas Dixon, Jr.'s *The Clansman*, a novel published in 1905, which later served as the basis for D.W. Griffith's film, *The Birth of a Nation*. The narrative is set in the Carolinas during the post-Civil War period of 1865-70 and, at one point, concerns the double suicide of a white mother (named, very suggestively, Mrs *Lenoir*) and her daughter after they have been raped by a rampaging

band of black men. The coroner's jury reports that they were killed by accidentally falling over a steep cliff known as Lovers' Leap, but Doctor Cameron—a friend of the family—suspects foul play. In a chapter entitled "The Hunt for the Animal," he decides to conduct an experiment:

When the bodies reached the home, Doctor Cameron placed Mrs. Cameron and Margaret outside to receive visitors and prevent any one from disturbing him. He took Ben into the room and locked the doors.

"My boy, I wish you to witness an experiment." He drew from its case a powerful microscope of French make.

"What on earth are you going to do, sir?"

The doctor's brilliant eyes flashed with a mystic light as he replied: "Find the fiend who did this crime—and then we will hang him on a gallows so high that all men from the rivers to the ends of the earth shall see and feel and know the might of an unconquerable race of men."

"But there's no trace of him here."

"We shall see," said the doctor, adjusting his instrument. "I believe that a microscope of sufficient power will reveal on the retina of these dead eyes the image of this devil as if etched there by fire. The experiment has been made successfully in France. ..."

Ben watch him with breathless interest.

He first examined Marion's eyes. But in the cold azure blue of their pure depths he could find nothing. "It's as I feared with the child," he said. "I can see nothing. It is on the mother I rely. In the splendour of life, at thirty-seven she was the full-blown perfection of womanhood with every vital force at its highest tension..."

He looked long and patiently into the dead mother's eye, rose and wiped the perspiration from his face.

"What is it, sir?" asked Ben.

Without reply, as if in a trance, he returned to the microscope and again rose with the little quick nervous cough he gave only in the greatest excitement, and whispered: "Look now and tell me what you see."

Ben looked and said: "I can see nothing."

"Your powers of vision are not trained as mine," replied the doctor, resuming his place at the instrument.

"What do you see?" asked the younger man, bending nervously.

"The bestial figure of a negro—his huge black hand plainly defined—the upper part of his face is dim, as if obscured by a gray mist of dawn—but the massive jaws and lips are clear—merciful God!—it's Gus!" (§4.1:312-14)

Subsequently, the black man named Gus is located. He is bound and gagged, beaten, and dragged to a cave in the mountains by the white-cloaked members of the local chapter of the Ku Klux Klan (of whom Dr Cameron is the secret leader). That night he is judged before a flaming cross, confesses his crimes, and is summarily executed by this "Order of the Invisible Empire"—who, incidentally, describe themselves as "an institution of Chivalry, Humanity, Mercy, and Patriotism: embodying in its genius and principles all that is chivalric in conduct, noble in sentiment, generous in manhood, and patriotic in posture" (320).

While the blatant racism which oozes from the pages of this novel is very unsettling, the use of Science toward this end is perhaps even more disturbing. This particular episode illustrates how the popularization of

certain scientific theories might be exploited to serve the needs of extremist propaganda. Doctor Cameron supposedly saw an image of the villainous Gus in Mrs Lenoir's dead eyes—despite the fact that, scientifically, this image could not possibly have existed there. The reason is obvious: Gus's face was *not* the final thing Mrs Lenoir saw before dying! Consider the chronology of the event: immediately after the crime, "the mother cleaned and swept the room, piled the torn clothes and cord in the fireplace and burned them, dressed herself as for a walk, softly closed the doors, and hurried with her daughter along the old pathway through the moonlit woods" to the cliff (§3.12:305); and, there, the two victims exchanged last words of love and Christian faith before plunging to their deaths. Was the author of this novel unaware of his error? Or, in a more sinister twist, did he fully understand the science of optograms but chose instead to purposefully gloss over such annoying details—counting on the fact that the public's belief in the *possibility* of such retinal images would guarantee his Doctor's credibility? In either case, the reference to optograms in this text performs an invaluable function: to provide a believable "scientific" justification for hunting down and executing the black "devil" who was identified thereby.

As mentioned earlier, by the 1920s, the public's unquestioning belief in optograms began to wane—perhaps in part because of their continuously unrealistic portrayal in literature but, more importantly, because of their total lack of success in police murder investigations where they had been repeatedly searched for and never found. The very idea of post-mortem retinal images found itself demoted to the status of a mere "superstition" or a "legend." Witness, in this regard, the treatment given to it by the French author Maurice Renard in his very popular novel *Les Mains d'Orlac* (The Hands of Orlac) published in 1921.¹⁰ After the mysterious murders in Paris of two noted spiritualists, the French police question the coroner who had performed the autopsies:

Doctor Frouardet had performed the autopsies on both cadavers.

"No," he was saying, "there was not the slightest indication, external or internal..."

"And did you discover anything in the eyes?" asked M. Lambert-Gondat.

"No, I found nothing in the eyes—although I did look—oh, I'm not hiding it—I did look. You know ... my many observations have led me to believe that a person who is killed does not retain, photographed on his retina, the picture of his last vision, which might furnish the means of discovering the murderer. In my opinion this is a legend." (§25:318-19)

But also during the 1920s, a relatively new literary genre was beginning to take root in the United States—offering futuristic stories which depicted not only "hard" science but also *fictionalized* science. And it was through this new genre called science fiction that a modernized variant of the (now discredited) optogram eventually emerged: the necroscopic brain-scan. In this updated version, the location of the post-mortem images is now the brain itself instead of the eyes; a complex electronic instrument replaces the old-fashioned box camera as the device for extracting them; and (in some

narratives) the reconstituted "last vision" no longer takes the form of a simple photograph, but is rather a motion picture or a hologram which can played back like a video by the scientists.

An early precursor to this more extrapolative, science-fictional rendering of optograms can be found in an 1899 novel called *Dr Berkeley's Discovery* by Richard Slee and Cornelia Pratt. The story goes like this:

An American physiologist named Dr Berkeley makes a truly amazing discovery: by removing a piece of human brain from a recently-deceased person, dipping it in a fixative solution to prevent deterioration, briefly implanting it in an animal brain to reactivate it, and then examining it on a slide under a very powerful microscope, he succeeds in "developing" as photographs the visual images that the brain received just before death. He calls their source "memory cells."¹¹ About this time, a brutal crime occurs in New York: a young woman is found stabbed to death, and the alleged murderer is put on trial. The court has asked Dr Berkeley to use his new procedure on the dead woman's brain and to offer testimony in the case:

Being requested to describe the nature of his evidence, he rehearsed briefly but with absolute lucidity his theory of the memory cells, and the progress of his work, to prove that theory. ...

When Berkeley had concluded the account of his experiments, he stated that he had brought with him a number of sections from the brain of Mme. Massoneau, feeling that his evidence would best be presented to the court in the same form in which it had come to him. ...

He stated that, as the memory cells were visible only with the aid of a microscope of the highest power, which required an expert to manipulate it, he had photographed some of the brain sections, and would attach the resulting slides to a stereopticon. If the Court would order the room darkened, he would throw the pictures that the slides held upon the white wall, where they could be seen by all. ...

It flashed upon the wall, and the crowd saw against the background of a commonplace room, identical in all points with the photograph of that hotel parlour where the murder had taken place, the prisoner's figure.

As it wavered to its place on the screen, it seemed by some odd illusion to be moving down toward them from the wall. The face was distorted with a blind, unreasoning fury, and in one hand was the dagger, raised to strike. ...

The tumult grew uncontrollable. Such scenes had never been known in that grave room before. Only the quickness of the sheriff and his deputies prevented the crowd from falling upon the senseless man, and tearing him to pieces. The case of the State vs. Massoneau was over, and the verdict rendered by popular acclaim. (§14:192-200)

The idea that a person's memory is carried in the brain as photographs within "memory cells" may seem somewhat quaint to those of us living in the late twentieth century. But it is instructive to note that, even today, modern science still has no clear understanding of how human memory works. Despite decades of major technological advances like the development of EEGs (electroencephalograms), CAT scans (computerized axial tomography), MRI scans (magnetic resonance imaging), and PETT scans (positron emission transaxial tomography), brain scientists are still far from

agreeing as to exactly how this organ processes, stores, and retrieves memories. Laboratory experiments from the 1950s seem to have shown that memory cannot be localized in any specific part of the brain. But, beyond this, the biological mystery of how memory operates in the human brain continues to be largely unresolved. Witness, for example, what a few scientific experts have recently said on this topic:

The mechanism of memory remains far from clear. (Hart 153)

We are just beginning to gain some understanding of the brain systems that code and store these various aspects of memory. (Thompson 303)

At present the world of brain science is in the middle of...a revolution. Scientists now regard the brain as a hormonally driven gland, not an electrically driven computer. ... As gravity is the great unknown in physics, memory is the great enigma of brain science. (Bergland 93, 120)

...a mass of conflicting evidence in a bitterly contested field. (Rose 200)

Most modern hypotheses for how the brain creates memory can be divided into two basic groups: electricity-based theories (modifiable synapses, hologramic distribution, network redundancies, etc.) and molecular-hormonal theories (proteins, peptides, RNA, etc.). To adequately outline these various hypotheses would require much more time and space than can be afforded here. But it is important to simply point out that human memory is *not yet* fully understood, and that it will undoubtedly someday prove to be a complex combination of both neurological and molecular-hormonal functions working together within the brain.

In SF, one of the earliest 20th-century portrayals of a high-tech memory scanner seems especially interesting in this regard—all the more so since it occurs in a trilogy of novels published during the heyday of radio and (perhaps not coincidentally) around the time of the development of the EEG in 1929-34. This curious piece of technology, called a “mechanical educator,” appears (repeatedly) in Edward E. Smith’s famous *Skylark* series of 1928-1935. It is not only capable of reading the accumulated memories of both the living and the recently dead but also of transferring those memories directly into the brain of the examiner or onto an external “record” for later play-back. This device was first developed by a certain Dunark, the Kofedix or Crown Prince of the nation of Kondal, on the green planet called Osnome thousands of light-years from Earth. The novels’ hero Dick Seaton, after travelling there with his companions in his spheroid spaceship “Skylark,” borrows this technology and improves upon it. He explains how this extraordinary machine works:

“This is an improved model—it has quite a few gadgets of my own in it. Now, Mart, as to how it works—it isn’t so funny after you understand it—it’s a lot like a radio in that respect. It operates on a band of frequencies lying between the longest light and heat waves and the shortest radio waves. This thing here is the generator of those waves and a very heavy power amplifier. The headsets are stereoscopic transmitters, taking or receiving a three-dimensional view. Nearly all matter is transparent to those waves; for instance bones, hair, and so on. However, cerebin, a cerebroside peculiar to the thinking structure of the brain,

is opaque to them. Dunark, not knowing chemistry, didn't know why the educator worked or what it worked on—he found out by experiment that it did work; just as we found out about electricity. This three-dimensional model, or view, or whatever you want to call it, is converted into electricity in the headsets, and the resulting modulated wave goes back to the educator. There it is heterodyned with another wave—this second frequency was found after thousands of trials and is, I believe, the exact frequency existing in the optic nerves themselves—and sent to the receiving headset. Modulated as it is, and producing a three-dimensional picture, after rectification in the receiver, it reproduces exactly what has been 'viewed,' if due allowance has been made for the size and the configuration of the different brains involved in the transfer. ...

I had a big advantage in knowing that cerebrin was the substance involved, and with that knowledge I could carry matters considerably farther than Dunark could in his original model. I can transfer the thoughts of somebody else to a third party or to a record. Dunark's machine couldn't work against resistance—if the subject wasn't willing to give up his thoughts he couldn't get them. This one can take them away by force. In fact, by increasing the plate and grid voltages in the amplifier, I can pretty nearly burn out a man's brain. Yesterday, I was playing with it, transferring a section of my own brain to a magnetized tape—for a permanent record, you know—and found out that above certain rather low voltages it becomes a form of torture that would make the best efforts of the old Inquisition seem like a petting party." (Smith, *Skylark Three*, §4:33-35)

As the interplanetary plot unfolds, the narratological importance of the "mechanical educator" in these novels becomes instantly apparent. With its use Seaton succeeds in transferring to his own mind—and to the ship's permanent "record"—a wealth of knowledge from highly advanced alien civilizations, gleaned directly from the brains of their most enlightened scientists and rulers. And he is later able to discover secret invasion plans from both the living and newly-dead brains of a viciously bellicose race called the Fenachrone who are seeking to conquer the galaxy, but whom Seaton and his allies manage to defeat in the end.

Another much less "space-opera" variant of such brain-reading devices occurs in Stanislaw Lem's 1967 SF novel *The Invincible*. The crew of the spaceship *Invincible* has landed on the desert planet Regis III in a far sector of the galaxy. They have come to investigate the sudden disappearance of their sister ship *Condor*. After an extensive search of the planet, they finally locate the remains of the *Condor*: the ship is intact, but its interior has been ransacked, its bulkheads strangely pock-marked, and its entire crew killed. One crewmember's body, however, is found to be perfectly preserved; he had apparently stumbled into the ship's hibernator during the crisis and had frozen to death. The *Invincible*'s physician Dr Nygren, assisted by the neuro-physiologist Sax, examines the victim's body along with the ship's navigator Rohan. They attempt to "read" the dead crewmember's brain:

Nygren...picked up a small black satchel off the floor, opened it and pulled out that apparatus about which Rohan had heard so much but which he had never seen until now. With slow, almost pedantic movements, Sax began to untangle the cords whose ends had flat electrodes attached to them. He placed six electrodes against the dead man's skull and fastened them with an elastic band. Then he crouched down and pulled three pairs of headphones out of the satchel.

He put on one of these and kept testing the buttons of the machine inside a plastic case. His eyes were closed, his face bore an expression of deepest concentration. ...

This apparatus was referred to by the space crews as the "corpse-spy." With it one could "auscultate the brain" of recently deceased persons, or those dead in whom decay had not yet set in, or a body like this one that had been preserved by very low temperatures. Long after death had occurred one could ascertain what the last conscious thoughts and emotions had been.

The apparatus sent electrical impulses into the brain; there they followed the path of least resistance, moving along those nerve tendrils that had formed one functional entity during the preagonal phase. The results were never too reliable, but it was said to have obtained extraordinarily significant data on many occasions. In cases like the present one, use of the "corpse-spy" was clearly indicated. (§3:52-3)

The "corpse-spy" does its job, and the final scenes viewed by the dead crewmember are retrieved and observed. But (in typical Lemian fashion) the results are far from definitive:

At first he heard nothing but the humming of the current...he tightly squeezed his eyelids together.

Suddenly he could perceive clearly...It looked like one of the corridors inside the *Condor*, there were pipes running along the ceiling. The passage was totally blocked by human bodies that seemed to move. But it was only the image that was waving to and fro. The people were half-naked; shreds of clothing barely covered them. Their skin was unnaturally white and was sprinkled with dark spots like some kind of a rash. Perhaps these spots were not on the skin but were a peculiar visual phenomenon, for they were scattered everywhere: tiny black dots on the floor and the walls. The entire image seemed to fluctuate like a blurred photograph taken through a deep layer of flowing water. The picture seemed to stretch, then contracted again, billowing and swaying. ...

[Rohan] stammered: "But what did that *mean*?"

Sax unzipped his protective suit. ... "I don't know any more than you do," he answered. "Maybe even less." (§3:54-5)

It is important to note that, in Lem's portrayal of the necroscopic brain-scan, the reconstituted images are perceived *within the brains* of the examiners themselves (rather than, for example, on an external viewing screen). As such, they are prone to subjective interference—a kind of automatic "uncertainty principle" ignored by most earlier SF works. In fact, unlike all the previous narratives we have examined, here the victim's final vision proves useless: it solves no mystery, incriminates no one, and provides no immediate answer to the riddle facing the protagonists. Of course, this episode occurs near the beginning of the novel, and it would be narratologically self-defeating to do otherwise. But, Lem seems also to be offering in this passage an ironic commentary on the value of technology as it relates to human comprehension: "The results were never too reliable..." "I don't any more than you do...Maybe even less."

That is to say, it is still the human brain which is ultimately responsible for the "meaning" of the images procured. It is only when the brain interprets the visual images captured (by the machine, as by the eye) that real *perception* occurs. And it is at this crucial juncture—the point of

interface between the objective and the subjective—that all “scientific” explanations for phenomena observed in the “real” world take place: in the human brain. Thus, what Lem appears to be underscoring in this episode (as elsewhere in his oeuvre) recalls a similar epistemological question once raised by Flaubert in his highly satirical *Bouvard et Pécuchet*. After receiving a lengthy lesson in astronomy from his science-enthralled friend Pécuchet, the naïve Bouvard suggests quite simply: “Science is constructed according to data furnished by only one corner of space. Perhaps it doesn’t fit in with the remainder that we are unaware of and cannot discover” (779).

Much less postmodern in tone (although still able to generate a certain “sense of wonder”) are the necroscopic brain-scans portrayed in much SF cinema and television of the latter 20th century. For example, Roy Ward Baker’s 1968 British film *Five Million Years to Earth* features an “unconscious vision machine” which successfully reads the multimillion-year old racial memories of a locust-like alien found in a spacecraft beneath the city of London. Douglas Trumbull’s 1983 film *Brainstorm* depicts a team of scientists who develop an electronic mechanism that (à la E.E. Smith) records directly from the brain and stores on magnetic tape the totality of an individual’s sensorial perceptions—which can then be transferred to another who experiences them as if they were his/her own. The British SF television series *Doctor Who* aired a segment in 1975 titled “The Ark in Space” wherein a scientist removes a portion of the brain from a dead insect-like alien called a Wirran and stimulates it to recapture memories of the creature’s last thoughts. And, as recently as this past year, during the CBS television broadcast premiere of *Space Rangers* on January 6, 1993, the hero Captain Boon and Fort Hope’s science officer Mimmer recreate a 3-D hologram of the final moments of a murdered man by “reading” the dead man’s cerebral cortex with a high-tech scanner that is sensitive to certain residual radioactive elements in the brain.

There are doubtlessly many other films and TV serials containing this particular topos, but one which I find exemplary is William Castle’s *Project X*, a grade-B SF film from 1968 based on Leslie P. Davies’ two novels *The Artificial Man* (1965) and *Psychogeist* (1967). The year is 2118. The world’s geopolitical future is precariously balanced between the Western powers and Sino-Asia, both of whom, wishing to avoid thermonuclear war, have agreed to an uneasy truce but continue to search for other weapons to destroy their rivals and expand their empires. A certain Doctor Crowther, who had earlier developed a serum to erase a soldier’s memory in the event of his capture, is now asked by the Western government to reverse this process and recover the lost memories of one of their top spies, Hagan Arnold, who was captured by the Sino-Asians but then managed to escape. Arnold’s final message to the West at the moment of his capture was: “The West will be destroyed in fourteen days...repeat...fourteen days...” Dr Crowther assembles a team of scientists, and they construct a “laser pictograph” to reconstitute Arnold’s lost memories. The procedure is explained as follows:

Dr Tarbin: These holograms are images or pictures to be transmitted by laser beam instead of short wave or microwave. We can send any image or we can record any image. These images appear to the eye to be in solid form, although they are not.

Dr Crowther: Before he left on his Sino-Asian mission, Arnold took a crash course in the Oriental language. For several months, he was shown symbols as a method of instruction. This instruction has conditioned his mind to receive holograms. So we are going to transmit the facts we have in the hope that, when we get to the episode we don't know about, our action will reactivate his memory. The laser pictograph, as Dr Tarbin has indicated, will be our means of input and it will also show us exactly what is going on in Hagan Arnold's mind.

Electrodes are attached to Arnold's head and the memory-stimulation procedure begins. Several "lost" memories of Arnold's activities in Sino-Asia are recovered—including his rescue of another Western agent named Gregory Gallea (who had been presumed dead) and their subsequent escape from their captors. But at this point in the memory play-back, Arnold's brain suddenly resists—projecting into the laboratory a huge ectoplasmic apparition of his face, hovering above them and screaming. Unable to continue the experiment, Dr Crowther searches for a rational explanation for this unexpected apparition, saying to his superiors:

Dr Crowther: The lines on these EEGs are impulses, aren't they? Impulses which we measure electrically—in other words, energy.

Col Collins: All right.

Dr Crowther: Then you do admit that the brain is capable of producing a form of energy?

Col Collins: Yes, I understand all that but . . .

Dr Crowther: Ah, then why cannot this energy, under certain circumstances, become so strong that it develops its own motive power?

Col Collins: To move at its own will?

Dr Crowther: Yes, why not? There is still one third of the brain that is an absolute mystery to us, Colonel. I submit to you that the phenomenon that we saw in that room was really a form of energy created by Arnold's brain.

Col Collins: Next you'll be talking about the Id and the Superego.

Dr Crowther: Call it anything you like. I believe that our holograms released an energy, and that now that energy stands between us and the truth. We have failed.

During this time Gregory Gallea joins the group and accuses Dr Crowther of treason and complicity with the Sino-Asians in having purposefully sabotaged the experiment. In response, Colonel Collins demands that the laser pictograph's prodding of Arnold's memory continue, regardless of his subconscious resistance (and that of his exteriorized psychic projection) to their efforts. Dr Crowther protests strenuously, but is forced to comply. Predictably, the ghostly apparition appears again and prevents any further brain-scan but, this time, it kills Gregory Gallea. The experiment now seems to have failed utterly. One of the West's top espionage agents is dead, the other has incurable amnesia, and an attack by the Sino-Asians' secret weapon is imminent. But Dr Crowther suddenly has an inspiration:

Col Cowen: All right, Dr Tarbin, cremate the body.

Dr Crowther: No, don't! Don't destroy that body! This may be our chance!

Col Cowen: Chance? For what?

Dr Crowther: Gallea and Arnold were together. They shared the secret.

Col Cowen: Doctor, this man is dead—he's stone dead!

Dr Crowther: Wait! The body is clinically dead—that's correct, Colonel. But the brain cells are still alive!

Dr Tarbin: If we operate quickly, there's a chance, Colonel. A slim chance!

Dr Crowther: Look at it this way, Colonel. You have nothing to lose. If necrosis hasn't set in, if the skull fracture hasn't destroyed too much tissue, we may succeed.

Col Cowen: In getting a dead man's brain to reveal information?

Dr Crowther: Yes, by the same use of holograms.

Gallea's brain is extracted, set into a spheroid-shaped nutrient bath, hooked up to the laser pictograph's electrodes, and his memories are perused. It is discovered, to everyone's astonishment, that Gallea himself was the real traitor—during their arranged "escape," he had injected Arnold with the Sino-Asians' secret weapon: "a bacterial culture combining all the plague diseases of the Middle Ages" designed to decimate the West's population who, for decades, have had no knowledge of sickness. Worse, they had all been exposed to this lethal bug during the experiment itself! As panic grows, Dr Crowther quarantines the area. Then he realizes that, since the dying Hagan Arnold had been cryonically frozen for a week immediately after his return to the West and had been revived only when his injuries were no longer life-threatening, they had seven days left before the virus would activate—time enough to develop an effective antidote! The antidote is quickly created and distributed, Hagan Arnold is "programmed" for a new life, Dr Crowther is vindicated, the West is saved, and (in a final irony) Gregory Gallea's brain is preserved in the hope of revealing other biomilitary secrets of Sino-Asia!

Obviously, this particular SF tale combines a number of primary and secondary characteristics which have become common in this sort of fiction since the nineteenth century: the mysterious presence of metaphysical, exteriorized psychic projections (Villiers, Kipling), the politico-legalistic motivations for attempting such memory retrieval in the first place (Verne, Slee), the xenophobia (Dixon), and the use of high-tech brain-scanners to record such latent memories (Smith, Lem), among others. In this regard, *Project X* stands as a kind of one-stop-shopping warehouse of topoi associated with this theme. But it might also be seen as representing something more: mingling together elements of SF, fantasy, the supernatural, horror, spy fiction, and detective fiction, it exemplifies a hybridized breed of narrative that, in many ways, seems quite symptomatic of the growing heterogeneity of these literary/cinematic genres during the past few decades of the late twentieth century.

From laboratory to legend to literature and cinema, optograms and their variants have, for almost one hundred and fifty years, continued to fascinate scientists, storytellers, and the public at large. From a photo in a dead man's eye to futuristic necroscopic brain-scans, the possibility of "reading the dead" with the aid of Science, albeit still unrealized, remains a surprisingly

persistent notion—one which might even be called a deep-rooted obsession, given its enduring cognitive and affective appeal. But, for those interested in the history of SF and other forms of scientific narrative, it also provides a unique opportunity to witness how science can sometimes evolve into pseudo-science, become firmly anchored in popular belief, and then develop into a recurring touchstone for the fictional imagination.

NOTES

1. See Drougard, pp. 78-81. All translations are by me unless otherwise indicated. Many thanks to my coeditors of SFS, our editorial consultants, and all my "virtual" friends on the Humanist e-mail network for their advice and suggestions during my preparation of this article—in particular, Istvan Csicsery-Ronay Jr, Vivian Sobchack, Abbie Angharad Hughes, and Stan Kulikowski II.

2. See Shipley and Crescitelli, pp. 1252-1323.

3. In this regard, note the mini-portrait "carte-de-visite" craze of the 1850s, the wide popularity of "stereographs" throughout the 1860s and 1870s, and especially George Eastman's development of the first do-it-yourself "Kodak" camera in 1888 which brought inexpensive amateur photography (and a familiarity with photographic principles) to millions world-wide. See Lemagny and Rouillé, pp. 38-41, 80.

4. In reality, these popular assumptions go well beyond the facts. The retina does not act like a *permanent* photographic plate (as common belief would have it) but rather, in the words of Kühne, as an "entire photographic workshop, in which the workman continually renews the plate by laying on new light-sensitive material, while simultaneously erasing the old." Therein lies the crux of the problem. As further explained by one expert in the field:

It is a very romantic idea but, for a start, under normal daylight conditions there is very little rhodopsin in the retina; it is only used for dawn, dusk, and night vision. It would be pointless to try to recover an image unless it had been formed under conditions of low illuminations, rod vision not cone vision, and there would have to have been no illumination of the eye from the moment the image was seen to the time of fixation on the retina. Even the best images that we can see by nocturnal vision actually depend on quite small local differences in the concentration of rhodopsin which would be enormously difficult to measure without using the sensitive neural apparatus of the dead eye to detect it (don't even think it—the retinal nerve cells die within minutes of the cessation of blood flow). Further, our eyes are in continual motion, and the pigment is locally bleached and restored as we look from one place to another. The only image on the retina at death is the last one seen. Normally functioning eyes need an exposure time, as it were, of some ten milliseconds or so to see a new "picture," but experiments in the last century required several minutes to get a very crude image of a window on the completely stationary retina of a rabbit. Before that, the rabbit had been kept in the dark for a long time to maximize the amount of rhodopsin. Only if a person has stared fixedly at a bright object for several minutes before death, or less hopefully a dark one on a light background, having previously been in the dark, would even crude imagery be available for development. If their eyes had shut at death, the amount of light coming through the lids would still be enough to bleach the image if the retina were not removed and fixed immediately. The fictional accounts are all fantasy. —Abbie Angharad Hughes, Institute of Advanced Studies, Canberra, e-mail message to me on July 3, 1993.

Of course, it is still *theoretically* possible—if all the proper conditions are met: e.g., if the individuals stared for a few minutes at a brightly lit object before dying, if they

closed their eyes immediately upon death and remained in a darkened room, if their eyes were rapidly excised and the retinal tissue removed and bathed in an alum solution, etc.—i.e., if Kühne's experiments were systematically duplicated with a human eye. In fact, Kühne himself once attempted this. As explained by George Wald:

In the nearby town of Bruchsal on November 16, 1880, a young man was beheaded by guillotine. Kühne had made arrangements to receive the corpse. He had prepared a dimly lighted room screened with red and yellow glass to keep any rhodopsin left in the eyes from bleaching further. Ten minutes after the knife had fallen he obtained the whole retina from the left eye, and had the satisfaction of seeing and showing to several colleagues a sharply demarcated optogram printed upon its surface. To my knowledge it is the only human optogram on record. Kühne went to great pains to determine what this optogram represented. He says: "A search for the object which served as source for this optogram remained fruitless, in spite of a thorough inventory of all the surroundings and reports from many witnesses." (564)

5. I have asked a number of Russian and Slavic language professors about this supposedly "old Russian superstition," and none have ever heard of it. My guess, barring proof to the contrary, is that this belief did not originate in Russia and, in fact, did not predate the nineteenth century.

6. Another, also a murder mystery, is Cleveland Moffett's "On the Turn of a Coin" published in April 1900 in *The Black Cat*. And Moffett's tale is even more scientifically correct than Verne's in that the victim "closed her eyes with fright at the very moment when she saw the murderer, and never opened them since" (27) thereby, ostensibly, preserving the final image on her retinas for later inspection.

7. J.-K. Huysmans. *A Rebours* (Paris: UGE, 1975), p. 297. This controversial novel was originally published in 1884.

8. These two translations are from Villiers de l'Isle-Adam, *Claire Lenoir* (trans. Arthur Symons), NY: Albert & Charles Boni, 1925.

9. It is also interesting to note that Villiers' short story "Claire Lenoir" was originally written in 1867, or nine years before Boll's and Kühne's much-acclaimed discoveries. So what were his sources? The *Académie des Sciences de Paris* report on retinal images quoted by Villiers is pure fiction and never occurred. So how did Villiers come up with this idea almost a decade before it was to become common knowledge? The answer to this riddle might well be a French newspaper report published on September 26, 1863 in the *Publicateur des Côtes-du-Nord*, as cited in J. Bollery, *La Bretagne de Villiers de l'Isle-Adam* (Saint-Brieuc: Presses bretonnes, 1961), and translated as follows:

An English photographer, Mr. Warner, has had the idea of reproducing on collodion the eye of a steer a few hours after its death. Examining this under the microscope, he perceived quite distinctly on the retina the lines of the cobblestone floor of the slaughterhouse, the last object viewed by the animal as its head was lowered to receive its deathblow. This experiment is even more successful, according to its author, if it is done at a moment closer to actual death. Therefore, if one reproduced by photography the eyes of a murdered person, and if one operated within 24 hours of the death, one could discern on the retinas with the aid of a microscope the last thing that was present before the eyes of the victim. (110)

Whether or not this particular newspaper report was the true source of Villiers' use of retinal images in "Claire Lenoir" is of less importance than the realization that experiments on this phenomenon were, in fact, being undertaken (by photographers, among others) apparently long before the "official" scientific explanations offered by Boll and Kühne in the late 1870s.

By way of corroboration, an even earlier indication comes from R.W. Hackwood (cited in Alexander Kelly's *Jack the Ripper*, 26) who, in an issue of *Notes and Queries* published on October 3, 1857, registers his surprise and scepticism about a then-recent article in the *New York Observer*. Hackwood quotes the article at length, saying:

The astonishing and intensely interesting fact was recently announced in the English papers of a discovery, that the last image formed on the retina of the eye of a dying person remains impressed upon it as on a daguerrean plate. Thus it was alleged that if the last object seen by a murdered person was his murderer, the portrait drawn upon the eye would remain a fearful witness in death to detect the guilty, and lead to his conviction. A series of experiments have recently been made (Aug. 1857) by Dr. Pollock of Chicago, as we learn from the *Democratic Press*, to test the correctness of this statement. In each experiment that Dr. Pollock has made he has found that an examination of the retina of the eye with a microscope reveals a wonderful as well as beautiful sight, and that in almost every instance there was a clear, distinct, and marked impression. We put these facts upon record in the hope of wakening an interest in the subject, that others may be induced to enter upon these interesting experiments, and the cause of science be advanced. The recent examination of the eye of J.H. Beardsley, who was murdered in Auburn, conducted by Dr. Sandford, corresponds with those made elsewhere. The following is the published account of the examination: "At first we suggested the saturation of the eye in a weak solution of atrophine, which evidently produced an enlarged state of the pupil. On observing this we touched the end of the optic nerve with the extract, when the eye instantly became protuberant. We now applied a powerful lens, and discovered in the pupil the rude worn-away figure of a man with a light coat, beside whom was a round stone standing or suspended in the air, with a small handle stuck as it were in the earth. The remainder was debris, evidently lost from the destruction of the optic, and its separation from the mother brain. Had we performed this operation when the eye was entire in the socket, with all its powerful connection with the brain, there is not the least doubt that we should have detected the last idea and impression made on the mind and eye of the unfortunate man. The thing would evidently be entire, and perhaps we should have had the contour, or better still, the exact figure of the murderer." (268-69)

I have been unable to pursue these references any farther back than 1857. But it seems more than mere coincidence that many (if not all) of the earliest experiments on this phenomenon appear to have occurred during the years immediately following Hemholtz's invention of the *ophthalmoscope* in 1850.

10. The quotation from this novel is taken from its English translation, *The Hands of Orlac*, trans. Florence Crewe-Jones (NY: E.P. Dutton, 1929), pp. 318-19. Another, somewhat later, reference of this sort occurs in Graham Greene's 1940 novel *The Power and the Glory*: "The priest sat hopelessly at the man's side: nothing now would shift that violent brain towards peace... There was a legend believed by many criminals that dead eyes held the picture of what they had last seen—a Christian could believe that the soul did the same..." (§2:254)

11. The inspiration for Dr Berkeley's fictional "discovery" may well have been more than just a simple extrapolation of retinal optograms into brain "memory cells." An anonymous letter to the editor published on January 15, 1888 in the *New-York Daily Tribune* with the headline "Brain Pictures—A Photo-Physiological Discovery" discusses in detail the experiences of a doctor who claims to have found "curious markings which...did not belong to the ordinary structure" in the brain cells of a recently-deceased linguist who was "distinguished for his linguistic attainments." The

markings were subsequently identified as "characters in the Ethiopic, ancient Seriac and Phoenician languages." The doctor's letter concludes:

If anything practical shall result from this discovery, if for instance, future literary executors shall be able to extract from the distinguished dead posthumous poems, suppressed opinions, the contents of "burned letters," family secrets or the mysteries of life that are buried, it will be a truly remarkable achievement of science; but whole lives of patient experiment and profound study must be expended upon a perplexing field of investigation before such a marvellous result can be attained. My own business claims too much of my time to permit me to give the mysterious subject that attention it requires, but now that I have suggested its possibilities, there are without doubt others who will eagerly explore this hitherto unknown realm. New-York, Dec. 28, 1887. (6)

Perhaps not surprisingly, I have been unable to locate a record of any follow-up medical experiments to indicate that, in fact, "others" did "eagerly explore this hitherto unknown realm" after the publication of this letter.

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Abstract.—A popular belief during the late 19th and early 20th century held that the image of the last thing seen at the moment of death remained imprinted forever upon the retina of the eye. It was called an "optogram." This belief developed concurrently with rapid advances made in photography during this historical period, and was seemingly validated by certain scientific experiments in ocular physiology done in the 1870s. Looking for the "photo in a dead person's eye" soon became an accepted police investigative procedure and an established touchstone of much turn-of-the-century SF and detective fiction. In later 20th century literature and film, a modern variant of the optogrammic photo emerged: the dead brain itself was now "read" using high-tech scanners to record the deceased's final vision (or thoughts) before death occurred. The goal of this article is to examine this pseudoscientific literary motif, its origins and evolution, and to show how science fact can sometimes become science fiction and take on a life of its own in the popular imagination. (ABE)