Now, this is where the technology comes in. It is true, for a while, that the high cost of picture making was due to the unconscionable demands of the few "box-office"stars. But Shirley MacLaine and William Holden are no longer enough to bring people into the theater. And the high cost of film making today is due to overengineering.

Wide screen, 65mm negative, a monster camera and dolly that takes a 6-man crew to operate — this runs costs up astronomically — not only direct costs but indirect costs, because this stuff slows down production and extends shooting schedules.

We tend to forget that in the heyday of movies, most features, aside from blockbusters, were shot in 15 days, with minimal crews, so you could go to the movies for 25 cents or 50 cents in the biggest houses, with a stage show thrown in.

I do not overlook the current inflation and doubt that the 25-cent movie seat will come back in the near future. But the difference between that and $3 a ticket is more than can be blamed on inflation — I doubt that inflation has yet hit the 1200% level.

I have watched young folk come into Tucson here in a couple of Volkswagen buses, and shoot a feature in a couple of weeks with handheld cameras in riotous disregard of union regulations — they didn't hire a Teamster member to drive each minibus. As engineers and perfectionists, we might shudder at the final results, but there is something to be learned here.

We have been guilty of overengineering in every direction — in the July issue of the *Journal*, for instance, there is considerable discussion of a gadget which will play a super-8 home movie through one's TV set. The cost of such a gadget has to be nearly $1000, and if it does anything that a good $100 8mm projector cannot do better, I have not seen it mentioned. I suspect the public will manage to restrain its enthusiasm for such purchases.

But when this type of overengineering results in the simplest feature costing several millions of dollars to produce, then, we have been putting our efforts in the wrong direction.

I suggest that the reports of new technical advances in filmmaking to improve theater-going be looked at from a different point of view. We do not, really, need 4-channel sound, nor ultra-wide screens, nor multi-screen presentations, nor 3-D image projection, nor most of the other ideas which out-of-this-world inventors enjoy toying with. The public does not care about such things.

What the public wants is a good show, at a price it can afford. We already know how to make a good show; what our engineering efforts should be aimed at now is to be able to make an equally good show, for less money. This means less expensive equipment; a $35,000 camers must necessarily rent for a higher price than a $5,000 camera, and there is considerable doubt that anyone can see the difference on the screen. It means, also, that the equipment must be lighter and easier to operate, and require fewer persons in the crew. And the quicker a setup can be made and broken down, the more shots can be put in the can in a day — and this is where the bulk of the budget goes.

We can do without wide screens, stereophonic sound, and such garbage. We must learn to substitute VW buses for Cinemobiles. Our cameraman can learn again, that a reflector is just about as good as a "brute" arc, and needs no generator truck.

We've got to make a product the public can afford or we are out of business.

It's as simple as that.

July 29, 1972

JOHN S. CARROLL
8500 Old Spanish Trail
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ADDENDUM

Addendum on Anamorphic Projection

One of the major causes of eyestrain and discomfort in the viewing of theatrical films comes from anamorphic projection.

Superficially, one might jump to the conclusion that the taking and viewing processes are complementary, hence distortions introduced in one stage are cancelled in the next.

This is not the case. For mechanical reasons, the anamorphoser is placed in front of the objective lens, both in taking and in viewing. But, then, the anamorphoser is in the object space in taking, in the image space in viewing, and cancellation does not take place.

Consider the situation in taking. Since the anamorphoser is afocal, and is placed in front of the camera lens, the latter continues to have its normal depth of field and resolution characteristics. In effect, the camera has no way of knowing whether the scene before it has been optically compressed, or whether all the objects in view are tall and thin. In any case, image points are recorded as circles of confusion, and if there are any aberrations in the anamorphoser, these circles may be larger, but they are, in any case, still circles.

In projection, there is a different situation. Here, the film image, which has, remember, circles of confusion of normal size and shape, is imaged by the objective lens in the normal way. But then, the image is spread sideways by the anamorphoser to fill the wider screen, and the result is, all circles of confusion are likewise stretched. In the commonest system, all circles of confusion become ellipses with the horizontal axis twice as large as the vertical.

This is, by definition, astigmatism.

And optically, astigmatism is considered one of the worst faults of a lens, to be corrected at all cost, even that of admitting larger amounts of other aberrations. But in this case, it is even worse, because a normal lens containing some astigmatism will only produce elliptical image points at some distance from the axis, whereas in the case of anamorphic projection, *all* the image points are elliptical.

No doubt an anamorphic system could be devised in which cancellation could be attained. It is doubtful that it would be worth the effort. It would be interesting to run a test by showing two films in succession—one anamorphically on a 10 × 30 foot screen, the other normally with 1:1.33 ratio on a 10 × 15 foot screen. I think that the brighter, sharper, less grainy image on the latter would be so obviously superior that even the normally indifferent audience would register a preference for it.

Dear Sir:

I have found John S. Carroll's Letter to the Editor most interesting. However, some of his statements deserve additional comment.

I agree that there are conventions in all art, and that we accept a white marble statue with no rouge on the cheeks, etc. Nevertheless, it is questionable whether there has been enthusiastic rejection of stereophonic sound, at least by theater patrons. Theater owners say that stereophonic sound has definite box-office value. And the letters I receive criticizing theaters for not providing the stereo sound found in almost every home, would tend to indicate that wide-range stereo sound in theaters is both a dramatic and an economic box office plus.

Relative to Mr. Carroll's judgment that audiences prefer the 1:1.33 aspect ratio to any of the so-called wide-screen ratios, I must say that I know of no factual basis for such a judgement. I must agree with Mr. Carroll that bright, sharp pictures that are free from grain are highly desirable. I have frequently said in my own talks and writings that people seem to prefer small, sharp pictures that are free from grain, to large fuzzy ones that are not. But that judgment, even though it is based to a substantial degree upon objective tests, is also substantially subjective, and it has met with conflicting opinions.

I certainly agree with Mr. Carroll that a picture's cost should be compatible with the price for which it can be sold. But I disagree completely with his statement that the high cost of filmmaking today is due to overengineering. No amount of engineering can overcome the practice of paying "stars" a million dollars apiece from gross income. Nor can engineering, per se, control the size of crews, the costs of supporting whole companies on location, or the rental cost of a camera. The difference in rental price of a Mitchell BNC camera and an Arriflex, for example, pales into insignificance relative to the total production budget of a motion picture.

One more point, simply as a matter of fact. Mr. Carroll states in his *Addendum on Anamorphic Projection* that "for mechanical reasons the anamorphoser is placed in front of the objective lens, both in taking and in viewing. But, then, the anamorphoser is in the object space in taking, in the image space in viewing, and cancellation does not take place."

In the original CinemaScope system the anamorphoser was placed in front of a prime lens. But in many of today's anamorphotic lenses the anamorphoser is placed at the rear rather than at the front, so that the image recorded by the film has been stretched along the vertical axis rather than compressed along the horizontal axis. This puts the anamorphoser in the image space, both in taking and in viewing, and, depending upon other parameters, should result in circles rather than ellipses of confusion.

August 25, 1972

WILTON R. HOLM
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Biographical Note

Henry N. Kozanowski

Henry N. Kozanowski retired in January 1972 as Manager of Broadcast Television Advance Development for RCA Corp., a post he had held since 1941. During his career as a scientist specializing in television he received international recognition for his achievements, particularly for his contributions in the field of color.

Unlike many dedicated scientists, but perhaps like the best of them, "Hank" Kozanowski is remembered by his associates for his human qualities, including a great sense of humor, as well as for his professional achievements. A comment by an associate at RCA Corp.'s Broadcast and Communications Products Div. — "Dr. Henry N. Kozanowski combines a record of solid professional achievement with an easy ability to express the thoughts that flow from his busy mind. He responds with no loss of dignity to the sobriquet 'Hank,' for the familiarity is born of quiet respect among his fellows for the man and his accomplishments." (Some informal reminiscences by two of Dr. Kosanowski's long-time friends appear at the end of this Biographical Note.)

A native of Buffalo, N.Y., Dr. Kozanowski was educated at the University of Buffalo where he received the degree of Bachelor of Science in Physics in 1927 and the Master of Arts degree in 1928. He continued his graduate studies at the University of Michigan where he was a Research Assistant. He received the Ph.D. degree in 1930. He began his career in the Westinghouse Research Laboratories where he remained until 1935 when he joined RCA Corp.'s Research Department.

He joined RCA Victor at Camden, N.J., in 1935 where he participated in the development of camera equipment and military television and was responsible for developing the first airborne television transmitter operating in a band around 300 MHz. During World War II, Dr. Kozanowski worked on the development of airborne television cameras which, in conjunction with airborne transmitters, were produced in large quantities for experimental work in surveillance and missile guidance during, and after, the war. In addition to early work with iconoscope cameras, he made major contributions to the first practical camera devices, also airborne, which used the (then) newly developed image orthicon tube. Beginning in 1946, he was associated with RCA Corp.'s advanced development activity in television studio equipment. Among his accomplishments, he was responsible for the early evaluation of alternate approaches to film cameras for television and he was the first to propose using the vidicon for such cameras. He is also credited with many of the developments which transformed color television cameras from laboratory instruments into practical tools for broadcasters. He proposed the use of a 3-vidicon camera for color film pickup at a time when the tide of professional opinion ran almost overwhelmingly in favor of a flying-spot-scanner approach because of the presumed seriousness of the registration problem.

With characteristic enthusiasm, he spearheaded the development of deflection coils and focus coils constructed with a new order of precision, and proved that the registration problem could be solved by the use of such precision components in association with stabilized circuits. Three-vidicon cameras utilizing his developments are now used for color film pickup in most television stations equipped to originate color.

Dr. Kozanowski has been a member of the Society since 1953. He was made a Fellow in 1956. He has had the unusual honor of receiving two Society Awards. In 1963 he received the David Sarnoff Gold Medal Award "for his engineering accomplishments in the field of television and for his sustained drive to improve the quality and practical operation of television studio and film camera equipment."

In 1965 he received the Herbert T. Kalmus Gold Medal Award. The citation noted that: "Some of the advanced developments in color TV for color film credited to Dr. Kozanowski include 3-vidicon color TV equipment for 16mm and 35mm color film; completely stabilized 3-vidicon color TV film reproduction equipment; demonstration of live pickup separate luminance 4-tube color camera; completely transistorized separate luminance channel 4-vidicon color film chain using modular construction and including transistorized colorplexer and color bar generator; and many others."

Dr. Kozanowski has served as Governor of the Society (1968–1969) and as a member of the Television Committee.

He has published a number of scientific papers. Among those that have appeared in the *Journal* are: "Vidicon Film Reproduction Cameras" (Feb. 1954); "Lighting for Color Opaques on Television" (Nov. 1956); (with S. L. Bendell) "Colorimetry Film Requirements and Masking Techniques for Color Television" (Apr. 1956); and "Infrared Transmission Characteristics of Various Color Release Prints and Their Effects on Color Television Reproduction" (Nov. 1964).

Dr. Kozanowski presently resides at 435 Washington Terrace, Audubon, NJ 08106.