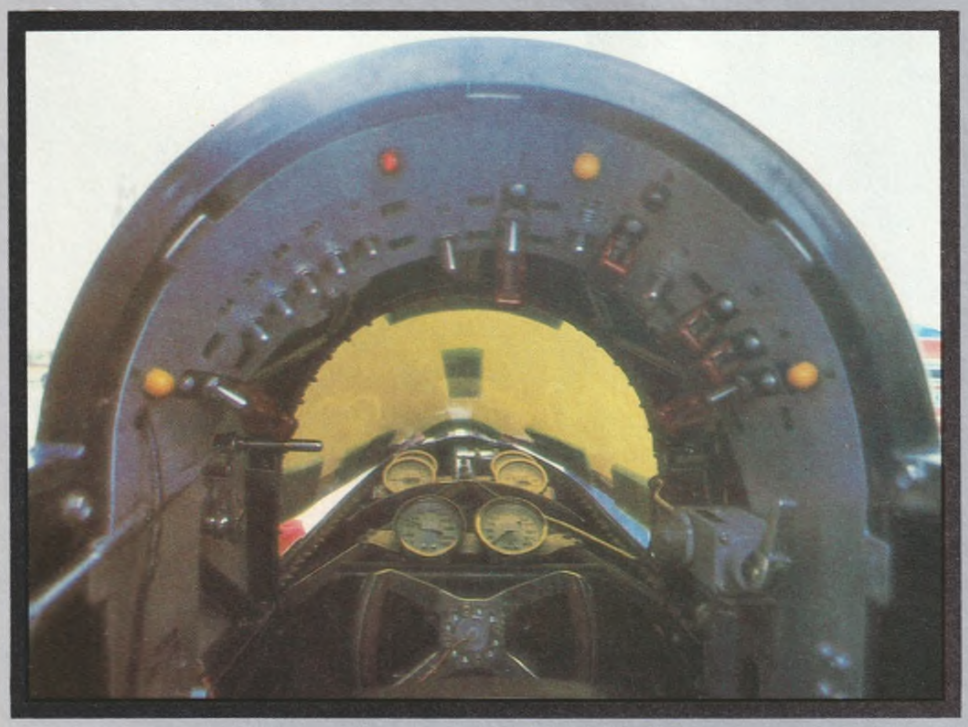
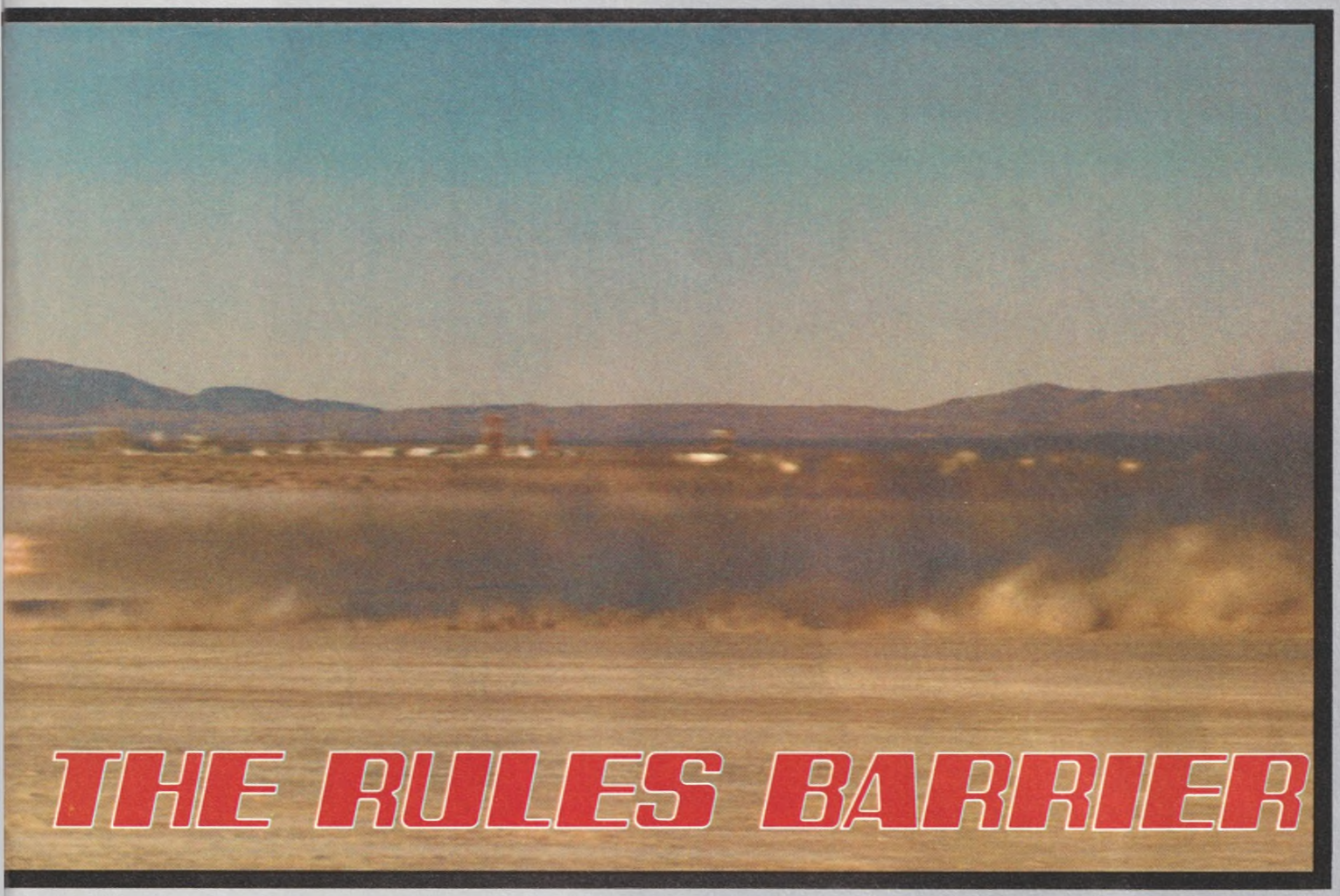
BREAKING

When The Sponsor Hops, The Rulebook Stops

Occasionally enthusiasts turn up daft enough to take a crack at the Land Speed Record, in the old days more for the pleasure of it than anything else (this attitude can still be found in the motorcycling world Thank God) but nowadays there is a rich seam of industry, advertising, TV and licensing rights to be mined. Our latest attempt started at Bonneville salt flats with a tricycle rocket car promoted by Hal Needham, who has had personal experience in this sort of thing besides as a stuntman and movie producer. The driver was to be Stan Barrett, another stuntman with a good "visual image" as one of the video people put it, while the engineering side of things was capably looked after by Bill Fredrick, a shakeout from the aerospace industry. Promotion was handled to a point of suffocation by a big beer company, whose last effort produced an interesting photo of a large powerboat 30 ft. in the air on its side above Lake Washington.



The rocket itself was fairly straightforward practice with a very streamlined form featuring a knife-line bottom edge to mitigate turbulence at higher speeds as early on the promoters were talking about going after the Speed of Sound, someplace around 740 mph at Bonneville's altitude, depending on the temperature which varies roughly one degree F for every mph as the temperature rises. Gen. Chuck Yeager was the first to break the S.O.S. in an airplane at 673± mph but he was a lot higher up where the air is good and cold. Gary Gabelich's rocket three wheeler was the closest landbound vehicle at 631. 367 mph but enough advances had been made in rocket design since that time that Eng. Fredrick and his little men thought that they could pull it off and perhaps have two records to advertise instead of one. To be



THE RULES BARRIER

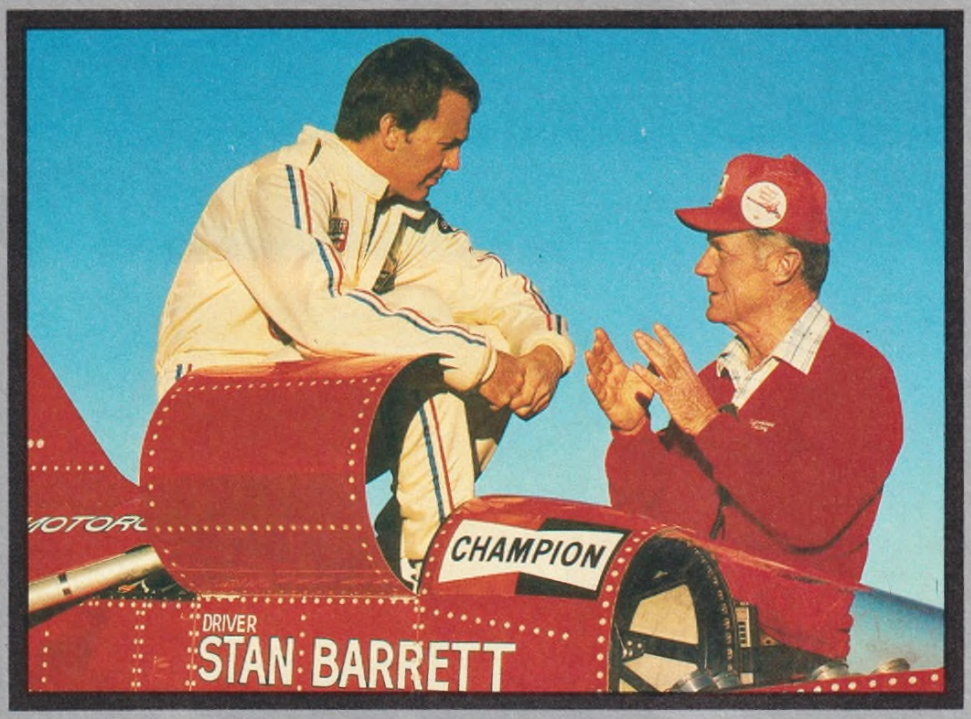
by Henry N. Manney III

sure the respected Earl Flanders was present with his FIM clocks (the rocket three wheeler falls under FIM) to lend an odour of sanctity to the proceedings but it quickly became apparent that all was not quite kosher. The rocket tri, for one thing, was prevented by its design from making a two way run inside an hour (as specified in FIM rules;) and furthermore the traps with their five overlapping lights were only about 50 ft. long. Earl explained that the principle of a short trap for vehicles traveling over 1000 kph (roughly 620 mph) had been applied for as well as the dispensation to do away with the two way run but "there was a lot of controversy about that". So what we could possibly have would be either a non-record, an advertising record, or something ratified much later (after a lot of beer had been sold) by the FIM if the proper sort of influence had been applied. The Speed of Sound was something else again and little did everyone know how much hard work it would take even to get close.

The machine itself was a semi-monocoque structure with the front and rear bits bolting onto the center section which was mostly fuel tank and engine. What there was of chassis featured square-section steel tubing while the trailing-arm front suspension reminded one of a sophisticated Earles front fork with extra reservoirs, coolers and mixers added together with springs of course. Aluminum 707 x 5 with integral cross-hatched flanges for rims served as wheels as your basic Velocette front tire wasn't expected to live long at 6000 rpm. Rear suspension was hardtail, really, with chrome vanadium steel struts holding spatted wheels on their ends. Total suspension in front was thought to be about 1.5 in. while at the rear general elasticity might provide a half in. Off road it might be but nobody really knew what 12 in. of suspension movement might do at 600 mph. As the late great Laurence Pomeroy Jr. once said, any suspension will work if you don't let it. As far as the engine itself was concerned, the opening Bonneville stage was looked after by a fairly simple Hydrogen Peroxide machine designed by Mr. Fredrick, using a ratio of roughly 90 percent H_2O_2 to 10 percent H_2O although the H_2O_2 could be stiffened up for more poke. On demand this got bled out through a silver-screen catalyst and issued as superheated steam. Later on a Katergolic Hybred solid fuel canister using polybutadiene mainly was stuck on the back; the H_2O_2 after passing through the catalyst releases its extra oxygen atoms which served to ignite the solid fuel so whooosh. The driver was stuffed in where there was room, giving him very little to look at besides a battalion of odd dials.

The Bonneville stay was sort of dragged out to accommodate TV which wanted lots of film, naturally, to go with their vast collection of other non-events. Weather was not totally co-operative nor was the salt, sadly depleted by some chemical company's pumping out a zillion gallons of brine a week to preserve pet food or something similar. Consequently the track was in poor shape and we were treated to the edifying spectacle of trucks bringing salt from other parts of the lake to shore up the track, which was quite soft and down to the mud in places. Why doesn't the elitist and environmentalist Sierra Club get on this chemical company instead of bothering us? Anyway after a couple of misfires and a run of around 566.535 we came down to the nut as the TV people had to get their film back to New York for the following Saturday's show. Accordingly Barrett got ready in the early morning hours and we went out to watch; an interesting process as there are radioed commands to turn this and poke that and lift pressure to 500 psi and then the machine gurgles and spits and sounds like a leaky teakettle until he mashes the right button and off it goes. No smoke unfortunately>

Photos by Ron Hussey



Keeping a Maybe World's Fastest Something going straight while holding the Go button calls for lots of Looks of Consternation from driver Barrett.

but lots of dust. Frankly I would rather watch the start at Daytona but there you are. Anyway, the ride was an eventful one as due to the soft salt, the rocket commenced teetering back and forth on its rear wheels not to mention the occasional giant leap and then the No. 1 chute fouled so it was some 7 or 8 miles down the track before Barrett came to rest, having probably soiled his Fruit of the Looms and thankful that he wasn't in the suburbs of Salt Lake City. As if that wasn't enough, a hovering TV chopper sprayed the still-venting peroxide all over the crewmen, necessitating a quick bath for all and sundry. Not so nice for him and not so nice for his family, is it? One of the reporters present asked an ad agency flake about the real purpose of all this. The reply was "To sell beer." Pretty.

The surface of Lake Bonneville obviously wasn't going to cut it so a couple of months later the block party assembled at Muroc Dry Lake aka Rogers Dry Lake on Edwards Air Force Base, a trick USAF test facility about 100 mi. NE of Los Angeles. Muroc is about 11 miles long and of hard-baked alluvial silt which speedily becomes mud of an incredible slipperiness and depth when the rains come which could have been any day now. What those big B-52s do landing on unpaved runways I can't imagine. Anyway the Air Force was sympathetic to the rocket tri's running under motorcycle (or cyclecar) LSR rules no less on their property as they have a vested interest in rocket development it seems, not only the early rocket planes flying out of here but they also send up Cruise missles every now and then. Happily a by-product was tuning down the commercial showbiz aspect of the run although the beer folk were still crowing about breaking the Land Speed Record which was a lot of old tat. Mr. Barrett did go a bare 6.27 mph faster than Gabelich but it should be pointed out that Gabelich's absolute top speed was in the middle of the mile trap and his 631 mph figure was an average of the two runs, not a one-way run through a 50 ft trap. Anyway Mr. Fredrick had fitted the machine with its 5-foot long solid fuel canister plus a trick nozzle out the back to add to the thrust; to make the driver's life a little less eventful the canard downthrust vanes on the nose had been modified, the suspension up there stiffened a bit, and a bit of streamlining around the tail added where aerodynamicist Van Aken had estimated a lot of unnecessary drag was taking place. In this form they commenced running again and gradually discovered, in betweenst being blown out by the occasional Northerly, that the assault on the LSR wasn't as easy as it had looked in the conference room on Madison Avenue. For one thing there was a bit of trouble with the nozzles, which basically are spun aluminum in a wasp-waisted shape coated internally with a substance called monolithic phenolic graphite. Any attempt to push out any real power (see 48000 bhp and above) by increasing the H2O2 percentage, boosting internal pressure of the H2O2 tank, or stuffing in more of the washerlike polybutadiene elements led to severe damage to the throat of the nozzle (coated additionally with leaves of a trick silica-graphite cloth laid in a rosette pattern) or even burning of the "megaphone" itself. One time the rocket got a delayed ignition due to a sticky fuel ball release valve and when it did go, spit out the nozzle throat. This meant that the rocket's 5400 deg. was directed at something not meant to handle it, with consequent erosion problems, and one-sided burning of the megaphone meant that the machine took off at a 30° tangent, missing the traps by half a mile but eventually was brought back on course by letting off the go button. According to the driver's airspeed indicator, the device clocked some 544 mph and spent no little time airborne as off the graded track there are soft spots, yumps, knotty crust, old concrete missile platforms and for all I know a buried city. Thus did it almost confirm Mr. Editor Girdler's prophecy that the rocket would become known as the B*dw**s*r Tent Peg. However as some consolation they did get the Longest Wheelie prize. While they were all getting their breath back, it is reported that Edwards Tower called on the radio to remind all that "thet thang" wasn't cleared for takeoff.

Another phenomenon that perplexed Engineer Fredrick right to the end was that it was very difficult, even with the aid of a vanful of computers, to calculate the burn precisely enough so that the fire would give maximum push somewhere close to the traps. Generally the fuel would burn out well before Earl Flanders' apparatus (which eventually got lengthened to around 100 ft. and widened as well!) which meant that max velocity as picked up from the airspeed indicator and from there to the rocket crew's telemetry unit or the max velocity as picked up by the Edwards Tower radar often were a lot higher than the FIM-timed speed. Promoter Needham kept talking about the target speed for tomorrow being 690 or something like that and while their intentions were good, a lot of the runs (this is spread over the best part of three weeks) were in the early 600s which isn't hay of course. The best run actually burning *through* the trap I think was 677.328 mph (radar—703mph) but the

nozzle was pretty well about to go. Deviating off course at 400 is one thing but 700 is another, so they had to do a mild redesign on that. About this time some of the Air Force heavies got into the act and there was a very technical conference at which it was found that (a) since the rear wheel and strut assembly was causing more drag than expected . . . about 80 percent in fact (b) the drag/power curves, which go practically straight up at speeds approaching Mach 1.0 (SOS) showed that the engine wasn't going to have power enough to overcome the shock wave that builds up ahead of the vehicle, that it was time to go to the turbo, in this case a Sidewinder missile cartridge mounted in a bit of drainpipe above the rocket motor. This little demon, giving another 5000 lb. thrust, was tried out with just a small H2O2 charge and managed to spook everybody by going off somewhat prematurely, not least the brave Mr. Barrett who was beginning to feel a trifle jumpy anyway and didn't particularly want to think about lighting up the cherry bomb (with its either go or no go characteristics) when he was already traveling 650 or so. Fortunately the machine seemed stable enough at speed (there were some rumours that it was wire-guided from the tower) but he was getting a tremendously rough ride on the far from smooth lakebed. The front wheel lost some diamonds out of its "tread," necessitating a new one, the damping had to be changed on the front end and new springs put in as well but even so the course markers looked about 40 ft. tall. And you think that your Bultaco rides rough?

As we were well into December and the USAF and TV people both were getting impatient (incidentally network TV had moved in without much warning, upsetting Needham's plans to have his own video film) so a full shot was planned . . . or almost full as it turned out. On a frigid Saturday morning our obligatory briefing in the North Base firehouse by the Smiling Colonel was at 4 a.m. no less but because of various little *emmerdements* the run actually got away at 11, making the target speed at least 10 mph higher because of rising ground temperature. Part of the delay was caused by finding a way to rig the Sidewinder (which has a burning time of 5 to 7 sec; low at the ends and high in the middle like a Brontosaurus) so that it could be armed from inside. Barrett had got a bit nervous watching Engineer Fredrick dancing around the outside in front of the rear struts as it could (and they have) go off at any time; in fact the rocket was secured to a handy pickup by a tow cord and you can imagine that there were a lot of jokes about the World's Fastest Pickup and Beep when you get to 35 etc. Anyway the rocket duly lit off with a lot of fire smoke and dust and when all was said and done, had turned 692.774 through the traps, having burned out early again in spite of the Sidewinder having gone alight at 14 sec, while the a.s.i. got it at 704 and the radar at 702, later updated (so the beer people said) to 714. Well, close. And you have to give them credit for that.

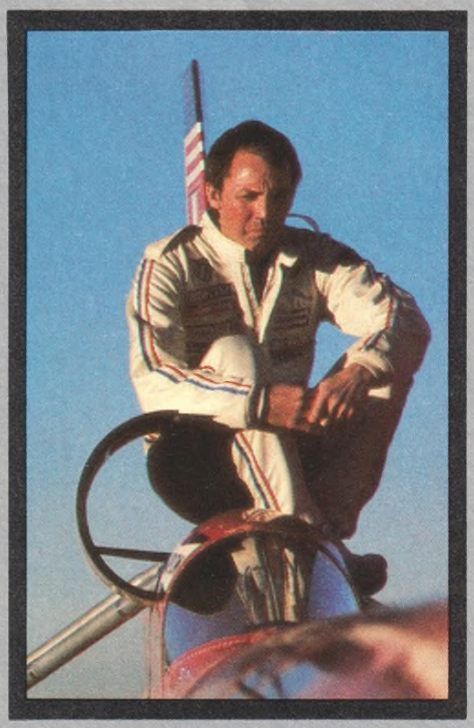
At the post-run briefing as well as after the one the following day after there had been a no-go due to a leaky feed valve being replaced by one that didn't feed at all, Promoter Needham went into a routine about how the FIM timing apparatus was antiquated and designed for outfits like the Blitzen Benz and Marriott's Stanley Steamer and with today's modern telemetry and the highly accurate USAF doppler radar their figures were good enough for him. Of course he had a lot of money tied up in this outfit and it was becoming steadily more expensive what with new>

Engineer, good guy and general Pyromaniac Bill Fredricks was in charge of bailin' warr.

nozzles every day at 4 thou the crack and it would be nice to score and then schlepp the rocket around to carnivals etc. but wouldn't it be lovely if a driver could just come back to the start with his flathead Harley and say well my special modern speedo showed 900 mph and everybody would clap and say gee George I guess that you have it. But that ain't the way it works. As we all tell our kids, wanting something to happen just so is not saying that it has happened or will happen just so otherwise all the football teams would be in the Super Bowl, wouldn't they?

Monday's run was going to be It for many reasons, not the least of which was that the USAF wanted their base back as they were going to shoot off some trick stuff. There was a slight hitch when Mr. Fredrick, who comes out of this whole business as a throughly honest and competent person, came steaming into the 5 a.m. briefing mad enough to fry an egg on the back of his neck. Apparently the security guard or someone had switched off the lights at the pits during the night which meant that the hot air heater for the rocket had gone off too, no small matter as the tri sits outside and has to be warmed up internally to some 250 deg. before it will deliver anything like full power. The resident Colonel got very serious and started going over roster duty lists in his head and we all sort of looked at each other thinking well not another day in this freezing place, but better than full field pack marches. As it happened the run did get off while it was still cold, about 7:45 a.m. the temperature according to them being 20 deg. (it was 20 deg. when I got up at 4:00) which corresponds to 731.9 mph as the SOS at that altitude. See how easy we toss those figures around? The rocket shot past us at a helluva rate after making a row like the crack of doom at the start, sounding almost silent as it slid through the traps (we were out there a *good* distance back you can be sure) as the main fire had gone out a ways back, although the Sidewinder was still flickering. Everybody dummied up about the speed as there was supposed to be a big Media Conference and Gathering when we got back to the pits; nevertheless the principals were smiling and posing for photos just like the money was in the bank and there was even a flyby of an AF jet or two just to add kitsch. Back at the pits, however, there was an interminable delay before the announcement that fuel had run out before the traps (again) and thus the trap times by the faithful Earl Flanders were 666 mph going in and 640 going out, showing a pretty high drag coefficient inasmuch as the chutes weren't even out yet. The airspeed indicator was useless as it traditionally goes crook around Mach 1, for some obscure reason the radar speeds weren't available yet, nobody including us or the chopper pilot hovering overhead had heard any sort of sonic boom (not that much was expected) and the only positive note really was driver Barrett, who is braver than Dick Tracy and seems to be sincere, saying that he felt a tremendous resistance, slid through it, and then heard a sharp crack that he thought for a moment might be the chutes going out prematurely.

A big enough batch of television cameras can make anybody (in this case driver/stuntman/designated body Stan Barrett) a hero.



So we kept waiting for the radar figures, a bit unusual as they usually came right away, and even a couple of the high muck-a-mucks got uneasy and went to see what was up. After a while they returned and were talking to Mr. Engineer Fredrick who didn't seem all that pleased at what he heard. Apparently the emming effing radar had screwed up, as radars will, and the victory they had celebrated was down the drain. Poor man. A crafty USAF pilot however, who looks like a junior Eagle Scout but was a Colonel no less (!) thought of a dodge and as he communicated it to Herr Engineer the latter's face began to brighten. The trouble was that a support water truck had started out on a parallel course to the rocket's track some 30 sec. before, some distance out naturally but today between the rocket and the tower radar. This was because in the still early morning conditions all the support vehicles thundering down there on the east side had raised so much dust that it interfered with Barrett's vision (he hasn't much time to look) as well as the shots from the video and USAF tracking cameras situated along the run, on the east side bien sur. As Sod's Law would have it, the radar had picked up the water truck's bigger target for several seconds at the most critical part of the run and then switched back, spitting out a nice tape containing a zigzag pattern. The young Colonel's idea was to run an AF van down the rocket's trace, record that on the radar, and then do the same on the track that the water truck had followed. The original tape could then possibly be re-heated, using the vectors and distances gained thereby to fill in missing information via a linear graph. Sort of like timing a Triumph by ear . . . some people can do it.

Somewhere along in here the USAF began to realize that they were the ones being asked to change the hot spark plug; they had offered the radar people's cooperation more as a matter of curiosity than anything else but now it appeared that the United States Air Force was being expected to put the nice Mr. Needham in a position where he could make a great deal of money. Accordingly late in the afternoon the USAF delivered a deliciously worded statement saying more or less that they had given the radar tapes and data to Needham's people for reduction by "best engineering practice" and that the radar was not intended for a primary data source, being used for visual acquisition only, not being calibrated and certified. In our judgement this data would not be sanctioned. So Nya. Needham, after some cogitation, issued from the sally gate with drums beating and flags flying, issuing in his turn a statement saying that the radar provides 20 data points/sec. "At one time we had three data points above Mach 1 (speed of sound) demonstrating an average speed of 739.666 mph or Mach 1.0106."

But that wasn't timed through the traps, was it, Earl? The opera ain't over till the fat lady sings. ■