Corvination

TUCSON CORVAIR ASSOCIATION TUCSON, ARIZONA

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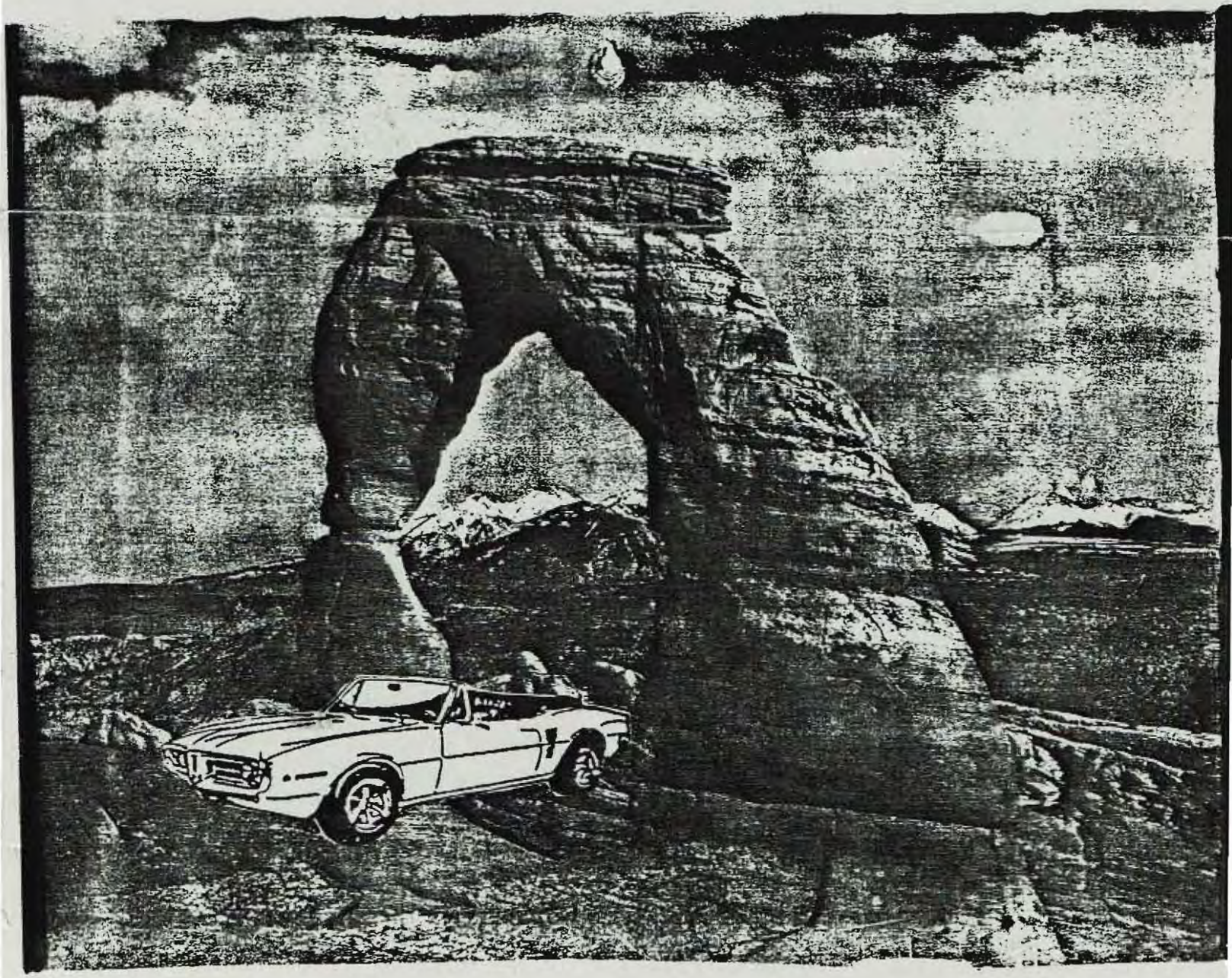

TUCSON CORVAIR ASSOCIATION

EST. 1975

Corvairsation is a monthly publication of the Tucson Corvair Association, which is dedicated to the preservation of the Corvair model of the Chevrolet Motor Division of General Motors. The Tucson Corvair Association is a chartered member of the Corvair Society of America (CORSA).

MONTHLY MEETINGS are held on the fourth Wednesday of each month exc ept December. One technical/social event is planned for each month with the exception of July and August.

MEMBERSHIP DUES: Initial dues are $ 15.00 (includes name tag), renewable for $ 12.00 per year and payable to the TUCSON CORVAIR ASSOCIATION through the Membership Chairperson.

CHANGE OF ADDRESS: Report any change of address or phone number to the Membership Chairperson. Do not report such changes to the Editor.

CORSA MEMBERSHIP DUES are $25 per year and include a subscription to the CORSA Communique, a monthly publication. CORSA membership is not require for membership in TCA but is highly recommended. See any TCA officer For information.

CLASSIFIED ADS are free to members and $2.50 per 4-line ad to all others.

DEADLINE for all materials submitted for publication in the Corvairsation is the 10th for that month's issue. Mail or deliver all materials to the Editor.

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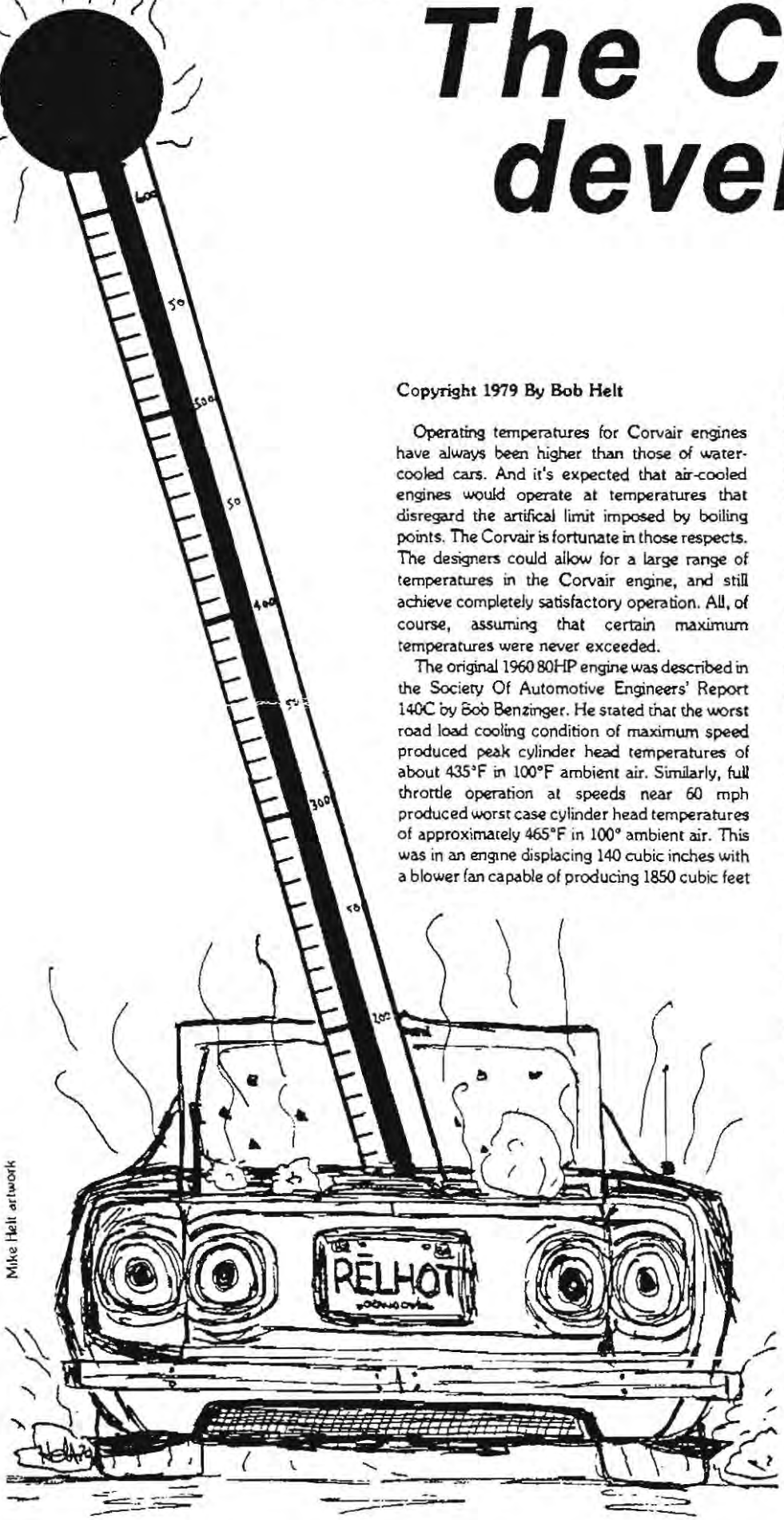
Cecil Alex & Dave Baker

This article appears in the Corvairsation 10 years ago last month and it still good information! VP

The Corvair develops a fever!



Mike Helt artwork

Operating temperatures for Corvair engines have always been higher than those of water-cooled cars. And it's expected that air-cooled engines would operate at temperatures that disregard the artifical limit imposed by boiling points. The Corvair is fortunate in those respects. The designers could allow for a large range of temperatures in the Corvair engine, and still achieve completely satisfactory operation. All, of course, assuming that certain maximum temperatures were never exceeded.

The original 1960 80HP engine was described in the Society Of Automotive Engineers' Report 140C by Bob Benzinger. He stated that the worst road load cooling condition of maximum speed produced peak cylinder head temperatures of about 435°F in 100°F ambient air. Similarly, full throttle operation at speeds near 60 mph produced worst case cylinder head temperatures of approximately 465°F in 100° ambient air. This was in an engine displacing 140 cubic inches with a blower fan capable of producing 1850 cubic feet per minute (cfm) of cooling air at an engine speed of 4000 rpm. To cool the engine oil, a separate folded-fin cooler was used which dissipated about 160 BTUs per minute. This oil cooler kept the lubricating oil down to 280°F when the engine was operated at worst case conditions (for oil temperature) of maximum vehicle speed in an ambient air temperature of 100°F.

While the 465°F maximum cylinder head temperature appears safe enough, the 280° oil temperature is cause for concern. Oil tends to thin out and oxidize very rapidly at higher temperatures with the rate of oxidation doubling for every 33°F rise in oil temperatures. Many experts recommend an absolute maximum oil temperature of 250°F with a preferred operational temperature of about 220°F.

The Corvair operational oil temperatures were about 230°F and 240° for speeds of 60 mph and 70 mph respectively in 100°F ambient air. So the oil temperatures at conserative speeds were within satisfactorily limits for long engine life in the 1960 Corvair.

From these cylinder head and oil temeratures defined in SAE 140C, operational temperatures started to increase as yearly model changes heaped more burdens on the cooling system. First there was the air conditioning option in 1961 that raised operating temperatures. This was followed in 1963 by a change in the oil cooler to a less effective design. 1964 brought a larger displacement engine which required more cooling since it developed more horsepower within the same overall size as before. But instead of additional cooling, the air volume capacity was decreased from 1850 cfm to 1460 cfm by a new fan design. In 1966 the Air Injection Reactor (A. I. R.) option, K19, (sometimes called a smog pump) was added to all Corvairs delivered in California (except those with turbocharged engines) to lower exhaust emissions. The A. I. R. option also included specially calibrated lean carburetors and revised distributor calibrations.

The A. I. R. option lowered exhaust emissions by burning excessive hydrocarbons in the exhaust manifolds as they leave the engine. This was done by pumping air into the exhaust manifolds, and producing an effect similar to blowing on campfire embers. When these hydrocarbons burn in the exhaust system, they produce significant temperature increases. One Corvair tested by Chevrolet with the A. I. R. option developed an exhaust gas temperature in the muffler of 1720°F while pulling a long grade at

58 mph with wide open throttle (W.O.T.). Muffler temperatures of 1600°F were quite common under W.O.T. conditions at 100°F ambient air with the A.I.R., causing the muffler hangers to burn through.

Although the A.I.R. was optional in 1966 and 1967, except for California cars, government mandated emission requirements forced the use of the Air Injection Reactor on all 1968 and 1969 Corvairs.

During mid 1966, Chevrolet engineers, realizing the temperature problems caused by the A.I.R., embarked on a 4762-mile shake-down test with a fleet of Corvairs, Chevy II s, Chevelles and full size Chevrolets. The trip was intended to be a general evaluation of the A.I.R. systems under desert, high altitude and other driving conditions. All of the cars were equipped with the A.I.R. There were two 1967 prototype Corvairs that made the complete trip: a 95 HP 3-speed, and a 110 Hp with Powerglide and air conditioning. For the desert testing a third Corvair with 95 HP, Powerglide and air conditioning was also used.

The test results for the Corvairs showed excessive operating temperatures during the desert testing. These excessive temperatures manifested themselves in several ways. Severe part throttle and high speed W.O.T. detonation was encountered using premium gas. Serious vapor lock problems developed with the two air conditioned Corvairs during the tests. Once vapor lock occurred, it became impossible to start the engines normally. Vapor lock problems also caused surging and speed loss when the engines were running. The critical soak period appeared to be 30-60 minutes. On shut-off some dieseling also occurred.

High speed runs at the Desert Proving Ground were made with an ambient air temperatures of 100-107°F. During the first of these tests at a constant 80 mph, cylinder head temperatures reached a maximum of 565°F with an average head temperature of 515°F being common. Oil temperatures under these conditions were all well over 300°F with an average temperature of about 315°F and a peak of 329°F. Oil temperatures even exceeded 300°F during prolonged idle at 100°F ambient.

Wide open throttle tests on the Corvairs were a total disaster! The air conditioned Corvairs would not stabilize temperatures! i.e., the operating temperatures just continued to climb. Each test was terminated when the cylinder head temperature reached 590°F to prevent melting the engine. Oil temperatures soared to 345°F. Even the non-air conditioned Corvair ran excessive temperatures with a head temperature of 550°F and oil temperature of 335°F. Muffler temperatures were well above 1600°F. Clearly all these temperatures were excessive and meant real problems for the Corvair.

Temperature tests run on five other Corvairs produced similar results to the desert testing, and an engine temperature summary chart was prepared for Chevrolet management analysis. Recommendations were made to delete the air conditioning option on all A.I.R. equipped Corvairs, and to use the 12 plate oil cooler on all A.I.R. equipped Corvairs. (air conditioned Corvairs already used the 12 plate oil cooler) An aluminized muffler was already standard on the A.I.R. cars due to the high exhaust temperatures.

No further development programs were initiated on the Corvair to resolve the temperature problems due to its status with Chevrolet management by late 1966.

These changes still left the Corvair running excessively hot at speeds of 80 mph and above, but did avoid the extreme conditions encountered during the desert tests.

Temperature tests run at the Desert Proving Ground by making changes to the same engine are shown in the table below:

EFFECT ON OPERATING TEMPERATURE

Change	speed in mph	Change in oil temperature °F	Change in head temperature °F
A.I.R. option	80	+22	+22
Air conditioning in 100°F ambient with 1966 style condenser	60	+30	+36
	80	+23	+30
	W.O.T.	+28	+35
Early model 1850 cfm fan	60	-9	-15
	80	-11	-13
	W.O.T.	-4	-5
12 plate oil cooler instead of 8 plate	80	-16	—
Oil cooler side shields	80	-7	-10
Louvers in lower shrouds	60	-7	-14
	80	-9	-13
Remove lower shrouds	60	-14	-24
	80	-18	-28
	W.O.T.	-18	-24

From the table above, you can evaluate the different ways available to make your Corvair run cooler. Also, since oil temperature extremes are most likely to occur compared to head temperature extremes, satisfactory oil cooling can be achieved by using an external high capacity oil cooler along with a larger capacity finned oil pan. One Corvair test engineer noted that using this set up, along with a 1.2 to 1 ratio blower pulley instead of the stock 1.58 to 1, hurt engine cooling somewhat (due to the slower turning fan) but held oil temperatures to a safe level. He also stated that oil temperatures were sufficiently low during engine dynamometer tests to permit an entire power run without backing off to cool the oil as was necessary in other 164 CID special high performance programs.

There was one Corvair development program however that was just being concluded in the later part of 1966. This was the development of the open chamber cylinder heads. These new heads were designed to lower exhaust emissions and replace the conventional quench chamber heads starting on the 1968 models, along with the mandatory use of the A.I.R.

These open chamber heads had a larger combustion chamber volume since part of the quench area was eliminated. To keep overall compression ratios the same as with the quench chamber heads, pop up pistons were used which protruded into the head chamber. This reduced the combustion volume with the piston at top dead center and maintained compression ratios as before. By reducing the quench area, the volume of unburned fuel mixture normally trapped in the quench area is reduced, and thus hydro-carbon emissions are decreased.

During the test program on the open chamber heads, it was found that they actually ran cooler than the quench chamber heads. Using the same 95 HP engine with A.I.R., the open chamber heads were found to run about 15° cooler at nearly all speeds. No mention was made of oil temperatures.

Although no further test results are known, it seems safe to assume that the open chamber heads were able to achieve an in-car cylinder head temperature reduction to offset the increased temperature effects of the A.I.R. It's not known whether oil temperatures were reduced. We know that the A.I.R. raised oil temperatures but there is no data to indicate that the open chamber heads caused a compensating oil temperature reduction.

So we have seen how the Corvair head and oil temperatures have climbed as yearly model changes compounded the cooling problem. Ultimately, the worst combination seems to be the A.I.R. and air conditioning on a car with the late style blower fan being driven in a hot climate.

It's interesting to note that the Corvair is not alone with the excessive oil temperature problem. The air-cooled VW was faced with similar problems. One test described in *Dune Buggies and Hot VWs* monitored the following oil temperatures at only 85°F ambient air in a 1970 Squareback.

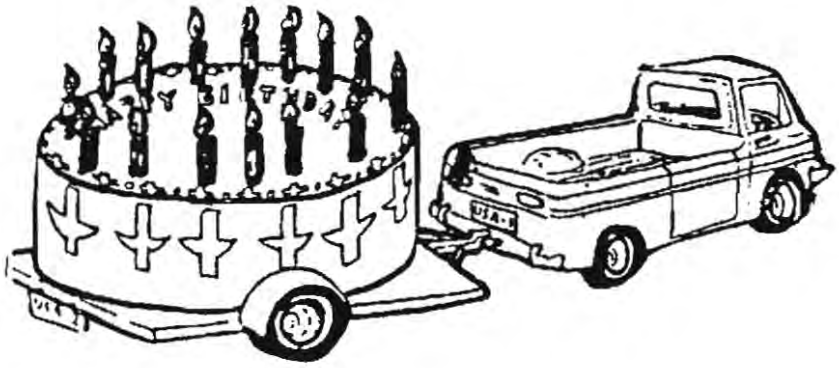
VW OIL TEMPERATURES

Speed in mph	Oil Temperature in °F
65	245
75	265
85	280

The Corvair excessive temperature problems had no easy solutions. A really large oil cooler would have reduced the oil temperatures significantly, but considerable design effort would probably have been required to lower head temperatures. A larger capacity blower fan might have been a partial solution, but this would have sapped considerable horsepower, and may also have caused more fan belt problems.

It's interesting to consider the idea that excessive operating temperatures were a large factor in the demise of the Corvair.

A CORVAIR WALL CLOCK RAFFLE will be held at the October meeting. Receive one raffle ticket for each item of food donated. We plan to have a fine collection of food to donate for Thanksgiving. Announcement to be repeated next issue. A personal cassette stereo also will be raffled.



AUG. BIRTHDAYS

Ethel Moore	15
David BAKER	25
Vickie Pershing	30
Jean Wining	09

IF WE MISSED ANYONE PLEASE ACCEPT OUR APOLOGY.

Our September mid-month will be a POTLUCK PICNIC at Kitt Peak. On Sat. Sept. 11 at 9:45 A.M., meet at the NorthWest corner of AJO and MISSION at the doughnut shop there. We leave at 10 a.m. If you wish to catch the early tour of the premises, you must go earlier.

"Oh, great! I locked the keys in the car!"

In seeking a place for our Christmas festivities, we found only one place that would provide a private room if we had less than FORTY people. On the fourth Wednesday of December, the 22nd, the festivities will begin at 6:30 p.m. at the OK CORRAL. A registration slip is being prepared to be included in later issues.

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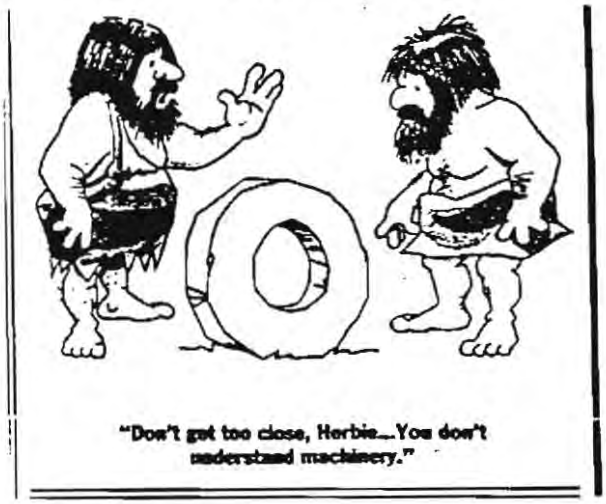

"Don't get too close, Herbie....You don't understand machinery."

Thanks To Vintage.

Treasurer's Report

Balance June 30, 1993.....$ 771.63

Income

Raffle	$ 59.00
Dues	$ 30.00
Merchandise sales & cans	$ 25.54
Advertisers	$ 38.21
Name tags	$ 4,25
Special Sale	$ 114.00
Flowers	$ 23.00
Misc	$ 4.00
Total Income.	$ 298.00

Expenses

Postage	$ 29.00
Jackets & embroidery	$
Mid-Month (Ice,Soda, Etc.).	$ 22.90
Flowers	$ 25.00
Total Expenses.	$ 76.90

Balance Aug 10, 1993.....$ 992.73

TUCSON CORVAIR ASSOCIATION LIBRARY INVENTORY

1960 CORVAIR SHOP MANUAL
1961 CORVAIR SHOP MANUAL
1962-63 CORVAIR SHOP MANUAL
1964 CORVAIR SHOP MANUAL
1965 CORVAIR SHOP MANUAL
1966 CORVAIR SHOP MANUAL SUPPLEMENT
1967 CORVAIR SHOP MANUAL SUPPLEMENT
1968 CORVAIR SHOP MANUAL SUPPLEMENT
1969 CORVAIR SHOP MANUAL SUPPLEMENT
THE AUTO BODY REPAIR BOOK
HOW TO KEEP YOUR CORVAIR ALIVE
CHASSIS AND BODY PARTS CATALOG, 1960-69
SERVICING THE CORVAIR-POWERGLIDE TRANSMISSIONS
CORVAIR REFERENCE GUIDE
AMERICAN CORVAIR PARTS CATALOG
CLARK'S CORVAIR PARTS AND CATALOG , 1993-95
CLARK'S 1993 SUPPLEMENT, PRICE LIST
CORVAIR UNDERGROUND, WALL'S CATALOG, 1993
CAR COLLECTORS MAGAZINE, 1979
CORVAIR DECADE
CORVAIR AFFAIR
HOW TO HOT ROD CORVAIR ENGINES
CHILTON'S REPAIR AND TUNE-UP GUIDE FOR THE CORVAIR
WINDMILL, 3-1-71 TO 10-1-72
CORSA COMMUNIQUE, 1972 TO PRESENT ISSUE
CORSA QUARTERLY, 1971 TO SUMMER 1978
CORVAIRSATION, 1978 TO PRESENT ISSUE

TOOLS AVAILABLE:
- CORVAIR TOW BAR WITH LIGHTS
- STEERING BOLT BUSHING REPLACEMENT TOOL
- BLOWER BEARING GREASER
- IDLER ARM BUSHING REPLACEMENT TOOL

VCR TAPES AVAILABLE:
- ENGINE TUNE-UP
- CORVAIR MOVIES BY GM
- THIS OLD "VAIR"
- NATIONAL CONVENTION, 1990, ONTARIO, CA
- POT LUCK PARTY, 1991, BAKERS

FROM BEVERLY BAKER, TCA LIBRARIAN

Corvair Puzzle

Thanks to the Vintage Times, newsletter of Vintage Corsa of Orange County for this great puzzle.

D	S	E	I	R	E	S	D	E	R	D	N	U	H	E	V	I	F	V	I	AIR COOLED
C	G	T	N	I	R	P	S	C	F	J	K	S	Y	A	X	C	O	H	K	CAVALIER
J	R	R	E	I	R	B	N	E	E	R	G	R	E	E	N	B	R	I	R	CHEVROLET
U	N	B	H	F	Y	N	S	E	D	A	N	M	V	C	N	K	W	F	E	CONVERTIBLE
E	S	T	I	N	G	E	R	H	K	D	F	H	X	M	L	F	A	M	S	COUPE
T	B	B	O	P	T	E	L	O	R	V	E	H	C	Y	E	G	R	C	E	CORSA
P	W	T	B	K	P	I	I	O	A	I	R	C	O	O	L	E	D	A	I	CORVAIR
R	U	I	V	U	D	Y	R	D	C	M	N	F	N	E	A	H	C	V	R	CORVAN
I	I	Z	O	V	T	E	B	I	B	D	G	M	V	Z	H	I	O	A	E	DELUXE
A	K	C	Z	D	T	G	L	J	Z	H	G	J	E	B	W	J	N	L	S	FIVE HUNDRED SERIES
V	P	U	H	L	H	F	H	U	T	J	E	T	R	Z	V	X	T	I	D	FORWARD CONTROL
R	U	D	W	A	E	F	T	N	X	I	N	F	T	O	S	V	R	E	E	GENERAL MOTORS CORPORATION
O	O	D	G	L	R	D	L	A	T	E	E	O	I	U	D	E	O	R	R	GREENBRIER
C	C	E	C	E	V	D	E	H	S	I	R	U	B	K	R	W	L	B	D	LAKEWOOD
F	R	D	M	D	F	K	M	V	K	H	A	J	L	Y	C	B	F	K	N	LOADSIDE
G	D	I	O	C	O	R	S	H	E	F	L	P	E	T	B	D	O	X	U	MONZA
V	Y	S	E	D	A	P	R	A	A	L	M	M	O	N	Z	A	B	V	H	NINE HUNDRED SERIES
T	P	P	Y	G	Y	J	F	H	O	R	O	D	E	G	A	T	L	T	N	NINTY FIVE
R	S	M	M	D	A	R	L	I	N	G	T	P	E	S	G	O	J	A	E	POWERGLIDE
A	E	A	E	H	O	T	A	T	O	P	O	Z	E	F	D	K	R	C	V	RALPH NADAR
N	O	R	A	L	P	H	N	A	D	A	R	G	L	D	S	N	F	N	E	RAMPSIDE
T	Y	K	F	R	B	Y	M	C	O	S	S	Y	I	E	B	E	H	M	S	SEDAN
A	R	L	U	F	K	C	V	N	U	G	C	U	J	Y	R	Y	A	N	E	SEVEN HUNDRED SERIES
X	L	A	K	E	W	O	O	D	E	K	O	O	H	Q	L	K	N	D	E	SPRINT
L	E	A	N	P	V	O	I	D	E	D	R	E	R	R	T	G	J	M	V	SPYDER
E	K	G	T	S	U	J	I	E	D	B	P	D	H	S	M	O	N	A	I	STINGER
H	C	S	D	H	A	L	U	E	D	C	O	S	D	O	A	L	A	L	F	TRANSAXLE
A	I	W	E	T	G	X	I	K	N	K	R	X	V	B	R	I	V	E	Y	TURBO
H	K	R	F	R	G	K	L	U	L	O	A	D	S	I	D	E	A	O	T	ULTRAVAN
A	E	G	E	W	E	F	G	E	L	O	T	S	O	F	F	U	R	B	N	WHALE
T	D	W	D	I	R	F	V	G	N	M	I	Y	T	T	A	E	T	G	I	YENKO
C	O	R	V	A	N	K	L	O	Y	F	O	H	D	S	H	K	L	K	N	
P	R	Y	I	Y	G	J	G	D	Z	X	N	K	G	D	T	D	U	B	H	PUZZLE DEVELOPED BY
N	I	N	E	H	U	N	D	R	E	D	S	E	R	I	E	S	B	U	D	RICHARD M HARTZLER

FOR SALE: 62 two dr. 110 HP, PG, Red, New fuel pump, Reg, Battery, New brakes, New tires, Everything in good shape! $ 2000.00
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FOR SALE: CORVAIR PARTS. Large outdoor yard full of great Corvair parts. Call Barry Cunningham for information at (602)747-9028.

CORVAIR PARTS: Large selection of early and late. Resonable prices. Larry Dandridge,(602)571-9680.

FOR SALE: 66 500 Coupe 110 4 sp. 3:55. Near new wsw tires. Straight chromed front and rear bumbers, air exh. grill. Twin glass packs, Call Ron Allen,(602)883-8458

FOR SALE: 64 Monza 2 dr. parting out, Call Del Light, (602)883-6794 or 883-5902

FOR SALE: 6 ea. N.O.S. eng. cyl. and Piston units complete. GM p/n 3847843 (for 64 Corvair) $400.00 Call Don Chastain (602)886-1076

FOR SALE: 64 Monza Coupe W/factory A/C. White, Blue interior, Trophy winner, low mileage, Az. car. $ 1500.00 or OBO.
Call Al Crispin (602)722-9445

PARTS FOR SALE: Early rear axle bearings, 14" tire & wheels, gas heater, NEW 65 Corvair manual. Wanted FC hub caps. Call Ron Bloom (602)323-9183

GREENBRIER-1961 FOR SALE; VIN 955, P/G, 64-110 eng. Best offer, Yellow W/Brown stripe, has Alt. Call Mike Zachery, (602) 232-7892

FOR SALE: 63 Greenbrier, overall good condition, Late model engine W/PG. $ 950.00 or make offer. Call Don Davis, (602)296-9811

WANTED: Strong Corvair engine, any year, (602)296-9811

FOR SALE: Engine cooling fan, 14" blades, 12 volt. Also reconditioned Alt. from 69 Corvair. (602)296-9811

******NOTE--- Ads in Vairs and Spears are free to TCA members. Non-members can place a four line ad for $2.50. Send ads directly to Corvairsation editor******

Vairs 'n Spares

TUCSON CORVAIR ASSOCIATION REGULAR MONTHLY MEETINGS
FOURTH WEDNESDAY of each month (except December)

Piccadilly Cafeteria, 6767 E. Broadway, Tucson

6:00 pm: Parking Lot Bull Session
6:30 pm: Dinner (optional)
7:30 pm: Meeting starts

COMING EVENTS

PLEASE CONTACT A BOARD MEMBER WITH ANY SUGGESTIONS!!

AUG	ON YOUR OWN - Or ?
SEPT 11	KITT PEAK-SABINO CANYON (CHOICE)
OCT	CASA DE LOS NINOS CAR SHOW
NOV 12-14	G.W.F.B.T. PALM SPRINGS
DEC	CHRISTMAS PARTY

This is a tentative plan with dates to be announced.

Regular Monthly Meeting: Wednesday, Aug. 25, 1993
TCA Executive Board Meeting: Sept.1,1993 at JB's Swan & Speedway, 7:30pm

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TUCSON Corvair ASSOCIATION

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