



After a colorful career in the kitchenware business, Solar turned to airplane exhaust manifolds. Today a Solar manifold is considered among the best obtainable.

POTS AND PANS but NO AIRPLANES

by FRANK CUNNINGHAM

Solar's excellent exhaust manifold business came about more by coincidence than anything else. It was decided to "try" the manifold originally made for its own airplane.



Most airplane companies make airplanes. But here is a firm that does so well at not producing aircraft that it's in the black—and will stay there.

"I suppose your boss, Ned Price, could put wings on that thing and make it fly," rings out the sarcastic voice of a housewife as she cracks an egg in a new skillet. Her husband, slouched in a kitchen chair reading the San Diego paper, answers a bit wearily, "Well, hon, pounding out skillets isn't what you'd call a swell accomplishment for an airplane builder, but Ned Price sees that we're still eating—and that's something in these days."

Several miles away from the domestic scene, the bakers at the Naval Training Station in San Diego are unloading a set of new pans. "Plenty nice for a bunch of gobs," one of the bakers remarks as he inspects the utensils. A fellow baker turns from an oven, looks at the pans, comments, "Sure are. These pans are built by the same outfit that knocks out the collapsible water tanks for the Army."

The first baker shrugs his shoulders, "That's a laugh, mates. My gal at the tavern says he got some beer barrels made there. Some company—frying pans, water tanks, beer barrels and baking dishes—everything but airplanes!"

"What's so funny about that?" an observer remarks, "Why should they build airplanes?"

The baker who has been doing most of the talking fixes a very superior look on his face, tilts the white hat on his head to a cocky angle, speaks firmly, "Because the outfit that makes all this stuff—and doesn't make airplanes—is the Solar Aircraft Company. Get it, fellow? The Solar Aircraft Company!"

Today Edmund T. Price, president of the Solar Company, can also laugh at the days of the early thirties when his airplane company built "everything but airplanes." Yet the people who scoffed at an aircraft company which was that in name only, can still snicker, although it won't be heard over the noise of business orders piling up. Solar, and its predecessor company, has been in business since 1927 and today is one of the best known names in aviation circles. Nevertheless, the total production of Solar planes has reached the staggering total of one (1)!

Yes, one airplane and the company now has about 350 employees, a backlog running well into six figures, sales of some half a million dollars last year, and has been "in the black" for the past seven years! And the Solar worker, who was ragged by his wife back in the early days of the depression, is working with an organization that is an important part of the aviation industry.

Solar, originators of the corrosion-resistant streamlined exhaust manifold, today has sold more manifolds (over 6,000) than any company in the world and its products have compassed the globe on foreign built, as well as American planes. It is the same company that in 1931 had a payroll of four men and then frequently couldn't meet the payroll. It is the same outfit that was thousands of dollars behind in rent; that didn't know each time a knock came on Ned Price's door whether it was a brush salesman or the sheriff to close the factory. Fortunately it was always the brush salesman.

Recently we sat in Mr. Price's office on the second floor of the Solar plant, which is on the San Diego waterfront, and listened to a youngish looking, bespectacled man in his middle forties relate how a struggle of 12 years has finally been crowned with success. On his desk was a picture of a trim all-metal airplane labeled "MS-1, Solar Aircraft Company."

"That was our production as an airplane builder," Mr. Price said as he took off his glasses, put them on the desk. "We made a great airplane and we almost ruined ourselves doing it. Let me tell you about it."

In 1928 (Price said) I came out to the west coast, after a career in business investments in the east, looking for an industry in which to put some money and go to work. After a lengthy search I decided on the Prudden-San Diego Company in San Diego, joined it as general manager. This company had been launched in 1927 with \$60,000 backing raised in San Diego.

The first two years the company had built two experimental all-metal airplanes. Ships of this type were a radical departure for that day. Of the nearly 300 companies in the field only the Ford Motor company, the Northrop company and the Prudden-San Diego company were building all-metal planes. The first two ships were experimental models which took all of the original investment and some more besides.

In 1929 the business was reorganized, renamed Solar and I was elected president, a somewhat dubious honor as we had over \$75,000 in liabilities and assets which, if sold wouldn't have exceeded \$25,000. But we had a knowledge of all-metal plane construction which over-balanced that condition. In June of that year we planned to fly our new ship, an eight-place cabin job. We did fly it, but not until January, 1930. In the meantime the stock market had done a tailspin and gloom abounded. Not enough gloom to discourage us, though, as this time the ship performed beyond our expectations. At least 10 companies were immediately interested in placing orders and the men who had struggled since 1927 would have joined hands and danced around a May Pole, if we had a May Pole.

The postman put an end to our joy. Notification came in one right after another with the notation: "Sorry, it's a grand plane, but business is rapidly on the decline and we can't buy any new ships." Every one of the 10 hopes vanished. Then we got a great publicity break when the MS-1 was ordered for a Pacific hop to Tokyo. The hop never materialized and neither did the money for the ship.

For a year we bolstered our spirits with
(Continued on page 68)



This is the Solar "flying nursery." Left to right are Mrs. Price and their children, Ned Price, Mechanic Al Lacey and Pilot C. W. Seaton. They flew 6,500 miles.



Solar was the first manufacturer to apply the drop hammer method in shaping corrosion-resistant metal into exhaust manifolds for use on high-powered plane engines.



Pots and Pans

(Continued from page 37)

dreams of sirdars that didn't come, with promises for planes never kept. In August, 1931, I had to fly back to my home in New Bedford, Massachusetts and decided to take my family with me. I loaded Mrs. Price, Mitzi, aged 9; Charles, 7; and Joan, 3, into the plane and under the piloting of capable Bill Scaton, well-known western flyer, headed eastward. The newspapermen got wind of the flight and the Solar MS-1 became the "Flying Nursery." At every airport the press met us. We were written up all over the nation. The "Flying Nursery," a ship so safe that the manufacturer made a transcontinental tour in it with his entire family, became a by-word of the time. We even had poems written about us and kindergarten magazines took up the story.

I didn't need poetry, I needed orders. Finally I got a break. The purchasing agent of an important airline, won over by Solar's merits, decided to buck the depression, buy six ships. This order would put us on our feet. The morning of the day the order was to be signed I went cheerfully to the agent's office visioning the resultant celebration that would be held in San Diego. When I got there I was informed that the order couldn't be signed, the purchasing agent the night before had dropped dead of heart failure? There was almost another victim of heart trouble right at that moment!

Mr. Price stopped in his narration to offer me a cigarette. After I had lighted it he was silent a moment. I spoke up, "And the new purchasing agent wouldn't give you an order?"

"Exactly. He said the manager had changed his mind and that business didn't warrant expenditures for new planes."

"The 'Flying Nursery' landed at San Diego with hundreds of publicity clippings, a family that had flown 7,000 miles, covered 25 states and 50 airports; landed at home port with an empty order book to find the ledger showed total debts were five times total assets. Some outlook!"

"Some outlook," I echoed.

"We finally sold the MS-1 to a Mexican rancher for use in transporting coffee from Tabasco to the coast, decided to sidetrack the manufacture of planes. We had what was admittedly one of the best ships in the industry, but we couldn't eat compliments. At a directors' meeting we voted to carry on, make whatever we could with supplies on hand. To have stopped work at this point would have meant a complete loss to investors as well as trusting creditors. So it was then we commenced making frying pans, baking utensils, hawk coils and beer barrels, even if our thoughts sometimes wandered to a metal plane loaded with coffee, flying over the countryside in Mexico."

I learned later that Mr. Price hadn't told me everything about the directors' meeting and also things Mr. Price hadn't told me about Mr. Price. He hadn't said that the vote was deadlocked on a motion

to remain in business and that his vote had broken the tie and kept Solar in business. He hadn't told me he comes from old whaling stock in New England that had roamed "the seven seas" through storms that were physical as well as financial. He hadn't said he was manager of the Haverford College football team back before the United States entered the World war which had beaten bitter rival Swarthmore 10-7 for the first time in two decades.

Some of what he did tell me was this. The main consideration was to begin work on a product that required very little capital and had a rapid turn-over with a satisfactory margin of profit. The kitchenware and beer barrels were partially an answer to that need. But the company officials were still air-minded even if beaten—but not to a punch drunk-degree—by the depression. They recalled that one of the new developments on the MS-1 was its exhaust manifold, especially designed by Solar engineers.

Up to that time manifolds had been a hit or miss proposition. Those being built were heavy, increased the weight of the plane, were of ordinary steel and had a short life. A midwestern company turned them out as a sideline, because no group thought them worth development. No company except Solar which found there was a need for an advanced manifold right in its own backyard at Naval Air Station, North Island.

This need was for Navy ships flying at night as the fire from the exhaust often

(Continued on page 86)

PORTERFIELD MODEL 50 \$1495

GOVERNMENT APPROVED

\$480 DOWN — 12 OR 18 MONTHS TO PAY



Model 50 is powered with a Continental engine, 130-H.P., at 1800 R.P.M.; Gasoline consumption is 3½ gallons per hour at cruising, or 27 miles to the gallon. Has large cabin door, roomy interior with dual stick controls, and 30-pound baggage.

WRITE TODAY
for information on the remarkable Model 50; also the Models 65, 75, 90 and 145. Same valuable territories available to live-wire dealers and distributors.

PORTERFIELD AIRCRAFT CORPORATION

1730 Wabash Avenue

Kansas City, Missouri

TWO words synonymous in aviation are **RELIABILITY**, PORTERFIELD. This new Model 50, as well as the other Porterfield Models, is no exception to the rule. The new 50 has a top speed of well over 100 m.p.h., cruises 92 m.p.h., lands 35 m.p.h., will climb fully loaded 550 feet per minute, and has a cruising range of 250 miles. In addition to safety qualities that are characteristic of all our models, the 50 stresses initial low cost in purchase and maintenance.

Other Types of Training and Sport Planes from \$995

Learn to Fly Without Charge • Pay as You Fly—the Easy Way

NEW C-D CLOUDSTER!

New COMPLETE KIT at lower price of \$95. Kit small
size than ever—the year's outstanding new
model plane! For use with "J" or "N" loco-
motors this kit now contains all necessary
parts—economy reduced time, fewer parts.
Wheels, all usual ground stock, strips, nuts, bolts, etc. At
dealers' or nearest supplier to U. S. post office only \$2.50.



10c
RACING
AUTOS

Atlantic scale. Six various
models of Indianapolis winners.
3 different drivers. Built for
the all size. Addons like extra
parts, etc.

DRILLSON - 22"

This No. 22 plane
has engine—all
material the per-
fume size of about 2'
long. 1000.
Fuselage
is built
in Cloud-
ster design
shape. Complete, ready to run. \$10.00.

SUPER-CATALOG: 34 Pages, featuring model airplanes
driving, sailing, radio-controlled—several U.S. equipment—gas
models—all will assure miles of fun—accessories—
parts, tools, cameras, ship kits and fittings, etc., etc.
Write us today for your copy. Dealer write.

Cleveland Model & Supply Co., Inc.
11000 Lorain Ave., Cleveland, Ohio, U. S. A.



STINSON SP-8B
For those who want
a really good, low
cost model. Especially
suited to radio control
work. Day Kit.
Price: Well \$12.50.
Complete
kit (including bat-
teries) \$15.00.

(Continued from page 84)
acres are dusted yearly, principally beans
and peas.

In dusting, the activity which brought
planes into agricultural prominence,
they face serious competition from the
autogiro and perhaps from some new
rotary-winged craft like the German
helicopter. Advantage of these craft
for dusting is that they can go straight
up or down, flying forward, backward,
sideways, or hover a few feet over the
field being dusted. Planes flying 50
to 100 feet over a field must travel 100
m.p.h. for safety.

Autogiros already have been used in
scouting for Dutch elm disease. Flying
slowly, they skim the tree tops, making
it easy for observers to locate suspected
trees for the guidance of ground crews.
They are similarly used in locating
wild citrus trees, suspected of being infected
with citrus canker, in the dense
vegetation of the southern lowlands.
Rotary-winged craft are being tried for
grasshopper bait spreading.

On the fringe of agriculture but typifying
the sky horse's place in modern life is the heroic story of pilot Roy
Varney, one of Nofza's sky horsemen.
For seven hours straight, during the big
floods last winter, Varney flew grain
sacks to the stricken town of Butte City
on the Sacramento River. Men, women
and children worked like beavers filling
them with dirt to stem the angry river.
But this field of merey flying is a big
one all by itself.

In Wyoming we come to the end of
our aerial trail. Just beneath a blanket
of wintry clouds roared an airplane,
fringing the hillsides. Along a snowy
road below jugged a man on horseback.
The plane crossed the low ridge and
plumped into sight almost over the
horse and rider, causing the pony to
buck. From the snowbanks the ex-
rider looked up at the cause of his woes.
Looking back, the pilot saw an unfor-
tunate individual violently shaking his
fists at the fading plane.

Maybe the unlured rider since has
learned he was expressing anger at Bill
Mondays, one of the large and growing
fraternity of sky horsemen. Bill was
homeward bound from one of his many
air jobs. Maybe it was helping Charles
Belden to locate lost stock. They do a
lot of flying together, herding in the
summer and counting big game on
winter range in the winter.

Regardless of where Bill had been,
this incident should warn all ranch and
farm hands—and horses—they must become
accustomed to such things. Old
Faithful and Old Paint have another
rival; the sky horse is feeling his oats.

END

Lots of Gas

THE transoceanic Boeing clippers of
Pan American Airways each carry
enough gasoline to propel an automobile
two and a half times around the world.

Maximum non-stop range of these Clip-
pers is approximately 5,000 miles.

Pots and Pans

(Continued from page 83)

blinded the pilots. Also, plagued by carbon
monoxide, some flyers had suffered severe
headaches because of the accumulations
of gas in their cockpits. The Navy official
met arguments for a better manifold by
citing their experiences with previous mani-
folds, which had not lessened, but increased
the fire hazard.

Solar had nothing to lose (Price said) by
building experimental manifolds as all we
could do was gamble for a break. Using a
drop hammer to work stainless steel, which
is highly heat-resistant, Solar made two
manifolds and the Navy finally agreed to
test them. Much to the Navy's surprise
the manifolds stood up under the most difficult
conditions. The Navy ordered \$500
worth of manifolds and Solar was on its
way rejoicing. Commercial companies followed
the Navy and by the end of 1932 Solar
had sold nearly \$50,000 worth of
manifolds. In 1933 sales jumped to nearly
\$90,000 and Lockheed, Douglas, Boeing
(our first big commercial customer),
Chance Vought and Sikorsky were among
the plane builders on the order ledger.

But the fast mounting sales didn't mean
an end to Mr. Price's worry; it actually
added to them. The company was so far
in debt that when a large order came in
there was no money to handle it. Once
his men went six weeks without pay so
material could be bought, fabricated and
delivered. They were paid back salary
with interest when the money from the
sales did come in. There were 27 men
working for Solar then. Today 27 men
wouldn't fill a small corner of the Solar
plant, this year running day and night
on three shifts. Up, up, up have gone the
sales and the factory was enlarged this
June with a \$55,000 addition. Over a dozen
engineers work on nothing but designing
new manifolds; manifolds to go on Army,
Navy and Coast Guard ships; manifolds to
carry the Solar flying-men trademark world
wide.

Ned Price still walks into the banks at
San Diego with his shoes shined and his
suit pressed and he says this is the way he
approached the bankers in the dreary days
when the banks could have closed him up
calling in loans. "He looks confident,"
the bankers had said. "He's put his personal
fortune into the company." Other
commercial houses commented when ques-
tioned about Solar: "Ned Price's confidence
in that business is amazing" was the
universal comment.

Yes, he had this faith in a business that
for a time was a phantom business—and
he knew that faith is what carried Solar
through the depression.

"Faith can work, provided it is used
with common sense," Mr. Price told me.
"I created the faith with the bankers, but
this faith was generated in me by the
knowledge that our men had the courage
to admit there was no sale for its airplane
and change course to other products. Two
hundred and fifty or so companies building
planes were broke during those days. My
confidence was secured by the loyalty of
the men working with me, sometimes we
(Continued on page 88)

**HUNDREDS
OF
GRADUATES
IN
U. S. GOVT.
AND
PRIVATE
POSITIONS**
—
**Day or
Evening
Classes**

ENGINEERING and DRAFTING

All branches including Air
Conditioning, Aeronautical,
Electrical, Mechanical, Archi-
tectural, Civil. Complete
month to 4-year. Columbia
Drafting Dept., Miami,
Fla., July 1938. Send
Catalogue.
302-1519 FSL, N. W.
Washington, D. C.

COLUMBIA "TECH"

Attention!

ON NOVEMBER 10TH
ALL NEWSSTANDS
WILL FEATURE THE
Giant Annual
SALON ISSUE

THE GREATEST ISSUE IN THE
HISTORY OF THE LEADING
PHOTOGRAPHIC MAGAZINE

★Featuring★

- 1 Over 50 pages of Salon Prints.
- 2 An 8-page special insert of outstanding full color photos.
- 3 A directory supplement listing all new photographic equipment.
- 4 Prize winners of the \$3,700 POPULAR PHOTOGRAPHY contest.
- 5 PLUS—Scores of regular features and articles specially augmented for the Giant Annual Salon issue.

All in the BIG DECEMBER

Popular Photography

RESERVE YOUR COPY NOW!

**MEN! GET THE FACTS ON THIS
REAL TECHNICAL UNIVERSITY
EDUCATION IN AERONAUTICS**

MAIL COUPON TODAY!

Our outstanding faculty, aviation industry type of equipment, and practical methods of instruction make it possible for AU to offer this thorough, state accredited aeronautical training... for a sensible time and money investment. Mail coupon NOW for complete facts about AU and careers in aviation open to AU-trained men.

OVER 40 SUBJECTS IN

Aeronautical Engineering . . .
Mathematics, Drafting, Airplane Design, Stress Analysis, etc.
Certified Mechanics (approved by United States Civil Aeronautics Authority) . . . Air

AERONAUTICAL UNIVERSITY (P.A.)
(Founded by Curtiss-Wright)
Curtiss-Wright Bldg., 1338 S. Michigan Blvd.,
Chicago, Illinois.

Send me FREE Illustrated Bulletin.

NAME _____
STREET _____

CITY _____ **STATE** _____ **AGE** _____

→ — →

AUTOMOBILE RACING BOOKS

Tell you how to lay out and build high-speed engines, racing car frames and bodies. Complete, easy-to-understand drawings and building instructions. World's most complete book on racing cars. Contains details of the world's fastest cars. Fourteen book deals largely with racing car parts, racing tracks, dirt track racing and engine rebuilding. (Each book entirely different.) \$1.00—\$1.00 each postpaid.



REPAIRS. Four piston covers, air
break, piston and engine rebuilding.
Black book slightly damaged. Ofer
\$10.00—\$1.00 each postage
\$1.15 C.O.D.

(Continued from page 86)
all went payless and the fortunate ones would lend a couple of dollars to the less fortunate to tide them over until we had some cash. If my men had failed me I would have been helpless and I want them to get the share of Solar's success that is certainly due them."

Ned Price, always in contact with "big business" from the time in 1919 when he achieved a youthful ambition by going with the Guaranty Trust Company in New York, is proud that Solar has never had any labor trouble. He wants his men to feel a part of the business. Paid good wages and salaries, Solar employees are encouraged and helped to buy stock in the company. They are given free legal advise by the Company's attorney on wills and minor legal matters. On the waiting list for jobs at Solar are thousands of names, but choice promotions are the reward for men within the company whenever possible. Any man is free—and is urged—to come to Ned Price's office for discussion of any bothersome problem, company or personal.

The president of Solar wants his men to realize they are important cogs in the success of the company, not robots with a number. He wants them to feel the thrill of advancing aviation's future, not merely to do a job because of a pay check.

"To an outsider, building manifolds might seem devoid of the business romance attached to aviation," comments Mr. Price. "The romance to the public is constructing ships that span the oceans, fast planes that win air trophies, tiny ships that get the man on the streets to go into the clouds. But there is a thrill to the work we are doing. Don't you imagine there is a thrill to finding a bunch of men who will work as a team to create something out of nothing during a decade of depression; to make a product that has been specified to fly over both the great oceans, on every continent, on round-the-world flights and for service at both North and South Poles? This we have done through faith in ourselves and each other in spite of some handicaps, but what of it?"

"My advice to men in business—aviation or otherwise—is to remember that you always have at least two pencils. With these pencils you can commence trading and this trading can go on and on and the trader can build up his capital as long as he trades wisely. I said he had at least two pencils but actually he doesn't have to have even that. Solar didn't have them when we were a failure at selling planes. We were in debt enough to buy pencils for all the writers and newspaper people the world over, all we had was an idea. It's ideas that make us what we are—and remember another thing. If you can't scale the distant mountain with your present strength you can always go around it. Solar found that way around in the aviation business."

And with the picture of Neil Price's success in mind, and the fact that Solar Aviation sales have risen steadily from \$500 a year to \$500,000, in tough times, it looks as if the mountain trails will soon be filled with people skirting the peaks and carrying in their hands two pencils.

Polish Air Force

(Continued from page 13)

ski, chief of the air force. He holds the highest rank in the aviation division of the Polish army, and is in charge of directing the air corps against the German air units.

There is a certain ironic parallel between the predicament in which Rayski finds himself and the Polish air force today and that of the Communist Russian air commanders in the recent Spanish war. Rayski has under his command a number of aviation squadrons that, in quality of men and equipment, are the peers of anything in Europe. The same situation was true in Spain where, in combat, the Russian airmen and their planes were proved to be among the best in the skies. But the Russians were in the minority—much the same as are the Poles. While their units were of high quality they were badly outnumbered by German and Italian aviation squadrons.

Although the Russian units won most of the air battles in which they were involved, they did not represent a real bulwark for the Spanish Republican forces against Franco's aerial raiders because they could not cover sufficient territory. While they would be chasing one group of potential raiders, half a dozen other units would be at work bombing Republican cities and cooperating with Franco's ground forces to bomb and strafe Republican trenches. Ultimately this preponderance of numbers became so overwhelmingly great against the Russians that they were virtually withdrawn from front line conflict. They finally were used only as defenders of Republican cities and before the end of the war were ordered home.

In Poland the Polish units were in the minority. Against them the Nazis have probably the largest and strongest single air force in the world. Consequently the Polish efforts at striking German targets are ineffectual. Rayski uses that measurement of all air force commanders; "Is the target offered worth the certain loss of men and machines?" in considering such plans as those calling for bombardment of Berlin and other German interior cities.

Just as certainly as he asks himself that question, the answer is returned, No." And so the Polish bombers stayed at home while the bombardment pilots were pressed into service in the hot little single seat fighters to give battle to the German bombers.

It is peculiarly true of combat flying that while fighter groups may win a majority of their own aerial battles, their side may be losing the aerial war. Frank Tinker Jr., the late aviation adventurer who fought with the Spanish loyalists and afterward wrote of his experiences, showed just such a picture of Spain in his magazine accounts in POPULAR AVIATION and other magazines. Tinker finally was transferred to a Russian squadron where he flew with the best of the Russian units. His accounts of

(Continued on page 90)