ADVENTURES IN JET POWER

JET PROPULSION--AN IDEA CENTURIES OLD--WAS DEVELOPED ONLY IN THE STRESS AND STRUGGLE OF A MODERN WAR-TIME EMERGENCY TODAY, PLANES POWERED BY JET ENGINES CARRY MEN THROUGH THE AIR FASTER THAN EVER BEFORE.. PROMISE EVEN GREATER SPEED AND POWER FOR THE FUTURE.

YOU'LL FIND AGAIN THAT FACTS CAN BE MORE THRILLING THAN FICTION IN THE TRUE STORY BEHIND--

SUPER-SPEED JET AIRCRAFT

ADVENTURE SERIES

– Prepared for –

GENERAL ELECTRIC

by PICTORIAL MEDIA

"IN THAT YEAR, A YOUNG ENGLISH INVENTOR ENTERED CAMBRIDGE TO CONTINUE HIS RESEARCH ON A 'PROPELLERLESS AIRCRAFT'."


"IN THE SUMMER OF 1941, NAZI BOMBERS SWARMED OVER ENGLAND. GALLANT RAF FLIERS, PILOTING SPITFIRES, FOUGHT THE RUTHLESS ENEMY IN THE SKIES WHILE LONDON BURNED BELOW...
"IT WAS A WAR OF SURVIVAL. OUR PLANES HAD TO BE BETTER...FLY FASTER ...OR ELSE!"


"WHILE THE DESPERATE BATTLE WAS GOING ON..."
AH, HERE'S THE AMERICAN ENGINEER NOW...
BEG PARDON, SIR...A CABLEGRAM FOR YOU. I BELIEVE IT'S URGENT!


HMMM...FROM THE BIG BOSS AT HOME. INSTRUCTIONS TO REPORT TO A LONDON ADDRESS FOR FURTHER ORDERS. NO EXPLANATION, NO DETAILS— SOUNDS MYSTERIOUS!
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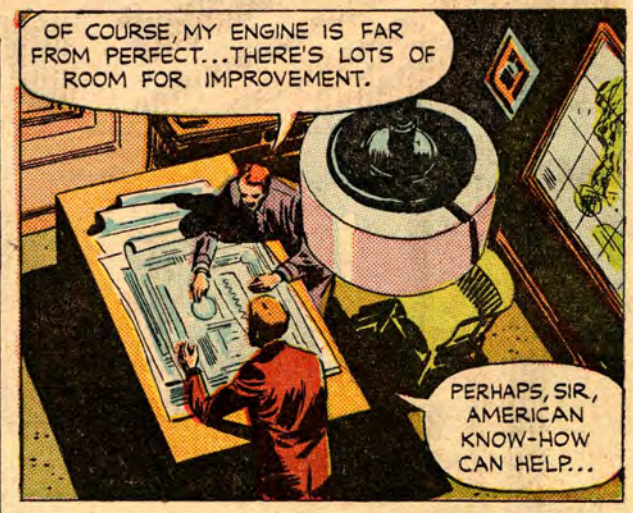
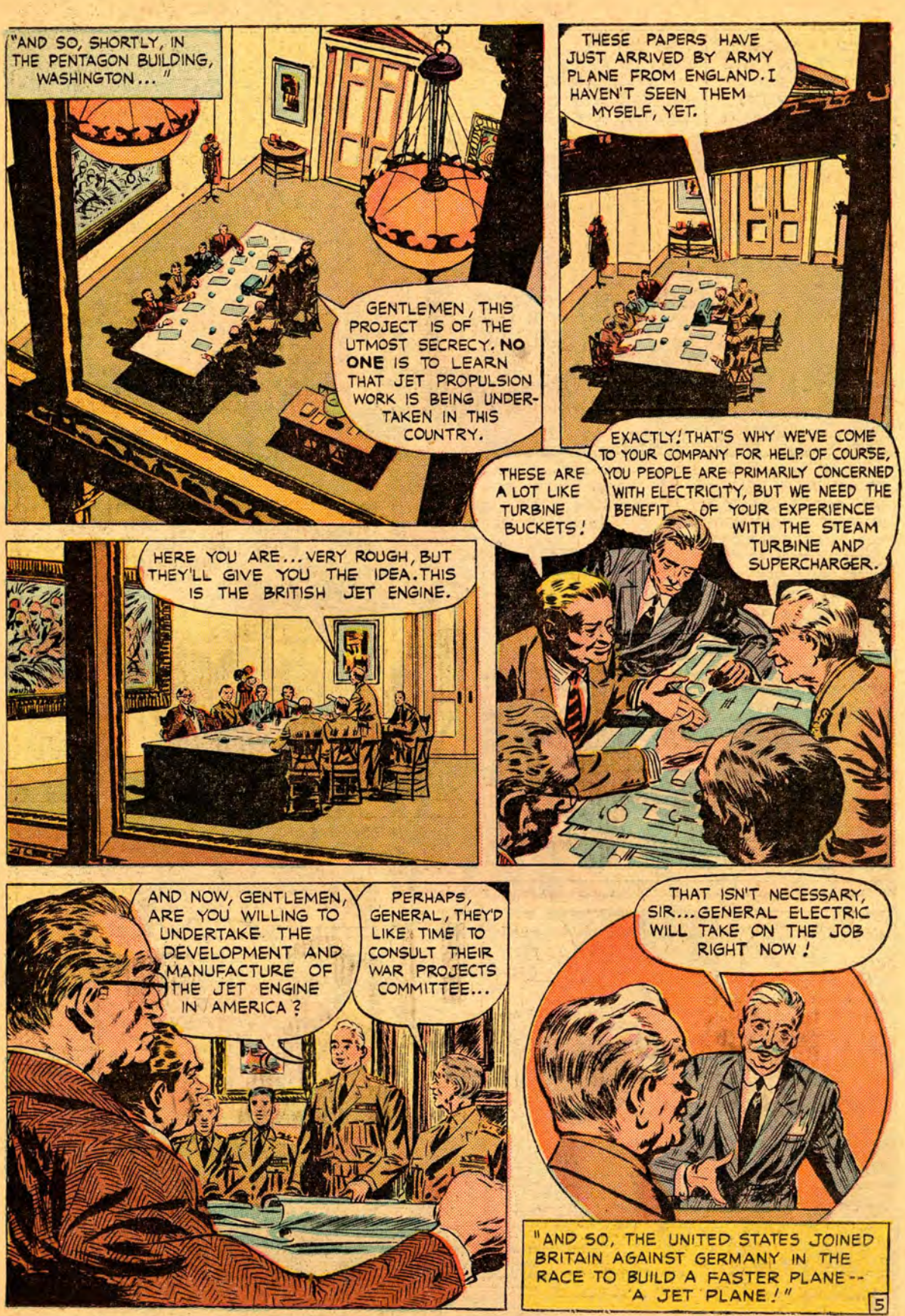
"HE WAS RIGHT ON BOTH COUNTS..."




"AND SO, SHORTLY, IN THE PENTAGON BUILDING, WASHINGTON..."
GENTLEMEN, THIS PROJECT IS OF THE UTMOST SECRECY. NO ONE IS TO LEARN THAT JET PROPULSION WORK IS BEING UNDERTAKEN IN THIS COUNTRY.
THESE PAPERS HAVE JUST ARRIVED BY ARMY PLANE FROM ENGLAND. I HAVEN'T SEEN THEM MYSELF, YET.
HERE YOU ARE... VERY ROUGH, BUT THEY'LL GIVE YOU THE IDEA. THIS IS THE BRITISH JET ENGINE.
THESE ARE A LOT LIKE TURBINE BUCKETS!
EXACTLY! THAT'S WHY WE'VE COME TO YOUR COMPANY FOR HELP. OF COURSE, YOU PEOPLE ARE PRIMARILY CONCERNED WITH ELECTRICITY, BUT WE NEED THE BENEFIT OF YOUR EXPERIENCE WITH THE STEAM TURBINE AND SUPERCHARGER.
AND NOW, GENTLEMEN, ARE YOU WILLING TO UNDERTAKE THE DEVELOPMENT AND MANUFACTURE OF THE JET ENGINE IN AMERICA?
PERHAPS, GENERAL, THEY'D LIKE TIME TO CONSULT THEIR WAR PROJECTS COMMITTEE...
THAT ISN'T NECESSARY, SIR... GENERAL ELECTRIC WILL TAKE ON THE JOB RIGHT NOW!
"AND SO, THE UNITED STATES JOINED BRITAIN AGAINST GERMANY IN THE RACE TO BUILD A FASTER PLANE -- A JET PLANE!"
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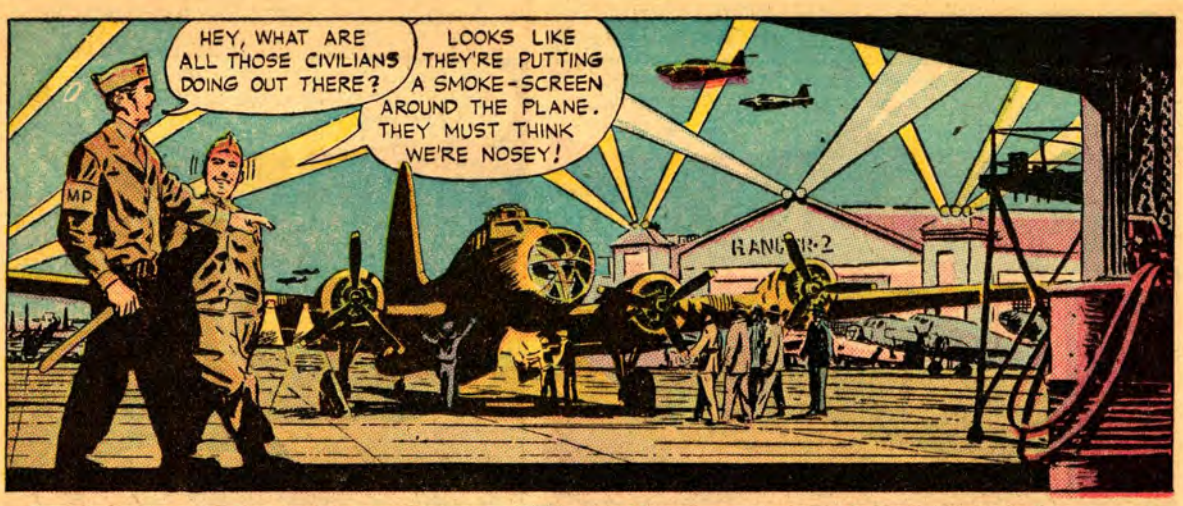
"SOON, IN THE G-E PLANT AT LYNN, FIVE KEY ENGINEERS ARE PULLED OFF TURBOSUPERCHARGER WORK..."
...SO YOU SEE, MEN, WE'VE TAKEN ON QUITE A CHALLENGE— AN ARMY AIR FORCES TOP SECRET... AND WE'VE GOT TO KEEP IT A SECRET! ANY QUESTIONS?
JUST ONE, SIR... HOW SOON CAN WE START?
RIGHT NOW! YOU FELLOWS ARE TO BEGIN COLLECTING MEN FOR THE DIFFERENT UNITS IMMEDIATELY. THE BRITISH ENGINE WILL ARRIVE IN A FEW WEEKS, AND WE'VE A LOT TO DO IN THE MEANTIME. SO GET BUSY... AND GOOD LUCK!
"THOSE MEN REALLY DID GET BUSY, TOO. IN JUST A FEW WEEKS THEY HAD COMPLETED DESIGNS FOR SEVERAL DIFFERENT PARTS OF THE ENGINE..."
JUST LOOK AT HER, TOM! ISN'T SHE BEAUTIFUL?
SO HELP ME, IF YOU DON'T STOP ACTING LIKE A PROUD PAPA, I'M GOING TO ASK FOR A TRANSFER!
"WHILE OUTSIDE..."
HI, FRANK... WHAT HAPPENS INSIDE?
SAY... YOU KNOW BETTER THAN TO ASK QUESTIONS LIKE THAT! IF THEY WANTED YOU TO KNOW, THEY WOULDN'T HAVE ME STANDING HERE!
"THEN ONE DAY... A MONTH FROM THE MEETING IN WASHINGTON... AT AN AIRPORT NEAR BOSTON..."
WONDER WHAT THAT BABY'S BRINGING IN?
6



"BUT THERE WAS NO RELAXING. THE ARRIVAL OF THE BRITISH ENGINE MEANT WORK NIGHT AND DAY... UNDER CONSTANT GUARD."

"THE NEXT SIX MONTHS WERE BUSY ONES AT G.E.-- AND VIGILANCE WASN'T RELAXED FOR A MOMENT..."

I DON'T LIKE THIS **PRYING** INTO THE PRIVATE LIVES OF OUR EMPLOYEES...

I UNDERSTAND, SIR... BUT WE'VE **GOT** TO WEED OUT THE "TALKERS."

"ONLY RELIABLE MEN, FROM WORKS MANAGER TO JANITORS, WERE CHOSEN..."

IT ISN'T THAT I'M NOT **INTERESTED** IN MY HUSBAND'S WORK... HE JUST **WON'T TALK** ABOUT IT!

"THEN AFTER SIX MONTHS... THE FIRST SUCCESSFUL TEST RUN."

SHE WORKS! AND I ONCE THOUGHT THE JET ENGINE WAS BUCK ROGERS' STUFF!

YES... IT'S BUCK ROGERS COME TRUE!

IT TOOK G E ONLY SIX MONTHS SINCE THAT MEETING IN WASHINGTON, TO DEVELOP A SUCCESSFUL JET ENGINE

.. BUT THAT'S NOT COUNTING THE MANY YEARS OF GAS TURBINE RESEARCH THAT MADE IT POSSIBLE -- RESEARCH FIRST BEGUN BY G. E.'S DR SANFORD MOSS ALMOST 40 YEARS BEFORE!

BUT, ED -- YOU SAID BEFORE THAT THE IDEA OF JET PROPULSION WAS **2,000** YEARS OLD! WHY, PEOPLE IN THOSE DAYS DIDN'T KNOW ANYTHING ABOUT ELECTRICITY - OR STEAM...

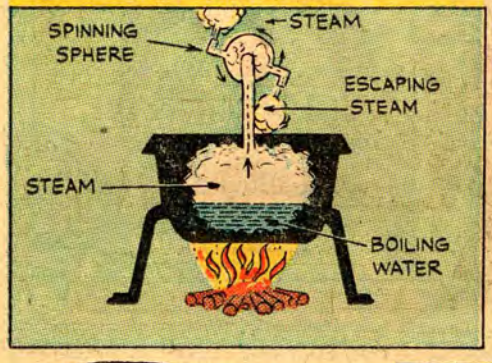
HMMM...YOU'RE NOT GIVING THOSE OLD BOYS ENOUGH CREDIT, JOHNNY. FACT IS, THEY **DID** KNOW SOMETHING ABOUT STEAM AND HOW TO GET POWER FROM IT.

"IN 100 A.D., HERO OF ALEXANDRIA INVENTED THE FIRST STEAM TURBINE."

IT SPINS BY ITSELF.. 'TIS MAGIC!

AYE, THE MAGIC OF MY MIGHTY BRAIN!

"STEAM FORMED IN THE VESSEL BELOW PASSED INTO THE HOLLOW BALL AT TOP. AS IT ESCAPED THROUGH THE NOZZLES IN THE BALL, THE STEAM JET MADE THE BALL SPIN."



THERE, JOHNNY-- THAT LAWN-SPRINKLER IS JUST A MODERN VERSION OF HERO'S **AEOLIPILE**. THE REACTION TO THE SPURTING WATER SPINS THE SPRINKLER.

BUT THAT SPRINKLER DOESN'T **GO** ANY PLACE. THAT'S A LONG WAY FROM A 600-MILE-AN-HOUR JET PLANE.

THAT'S RIGHT, JOHNNY. BUT IT'S BASED ON THE SAME IDEA.

"ACTUALLY, IT WASN'T UNTIL 1620 THAT SOMEONE HAD THE IDEA OF USING JET PROPULSION FOR FORWARD MOTION. REMEMBER SIR ISAAC NEWTON'S THIRD LAW OF MOTION?"

EVERY **ACTION** PRODUCES A **REACTION**, WHICH IS **EQUAL** IN **FORCE** AND **OPPOSITE** IN **DIRECTION**.

"THE IDEA'S SIMPLE, JOHNNY. BLOW UP A BALLOON LIKE THIS ONE... AND WHEN YOU LET IT GO..."

THE AIR SHOOTS OUT IN ONE DIRECTION THROUGH THE OPENING... AND THE **REACTION** PUSHES THE BALLOON IN THE OPPOSITE DIRECTION.

"OR TAKE A BOY STEPPING OUT OF A CANOE..."

"AS HE THRUSTS HIS FOOT FORWARD, THE CANOE SHOOTS BACK."

"NEWTON PLANNED TO PUT HIS THIRD LAW TO WORK IN A JET-PROPELLED HORSELESS CARRIAGE... BUT THE IDEA NEVER GOT BEYOND THE PLANNING STAGE."

"AND HERE'S A ROUGH IDEA OF WHAT ITS 'INSIDES' LOOKED LIKE..."

STEAM

BOILING WATER

FIRE

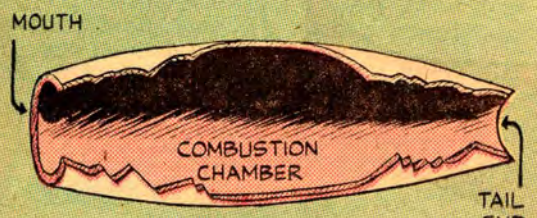
SURE, I GET IT... BUT A MODERN JET ENGINE DOESN'T GET ITS POWER FROM STEAM PRESSURE, DOES IT?

NO, JOHNNY. TODAY, JETS GET THEIR POWER FROM THE HOT EXPANDING GASES PRODUCED BY THE CONTINUOUS BURNING FUEL. GET IT?

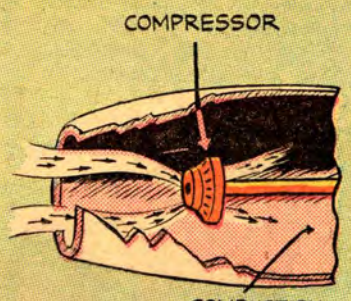
I-I GUESS SO... BUT...

TELL YOU WHAT, JOHNNY... I'LL DRAW A PICTURE FOR YOU...

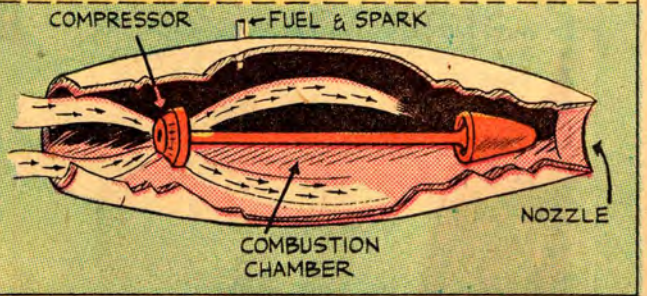
"FIRST, WE'LL START WITH THE SHELL OF THE WHOLE ENGINE... PRACTICALLY A BIG **COMBUSTION** CHAMBER."

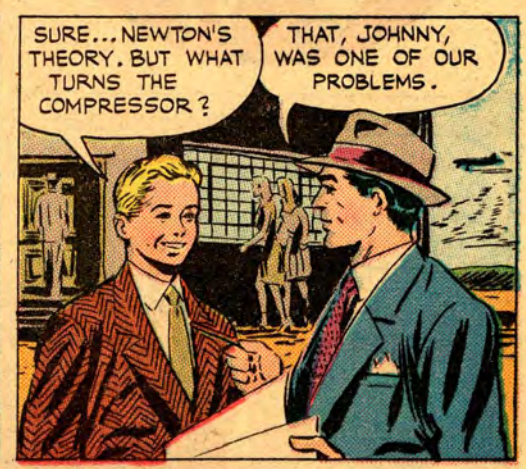


" INSIDE THE MOUTH IS A ROTATING FAN OR COMPRESSOR, WHICH SUCKS IN AIR, PACKS IT TIGHT AND FORCES IT BACKWARDS INTO THE COMBUSTION CHAMBER..."

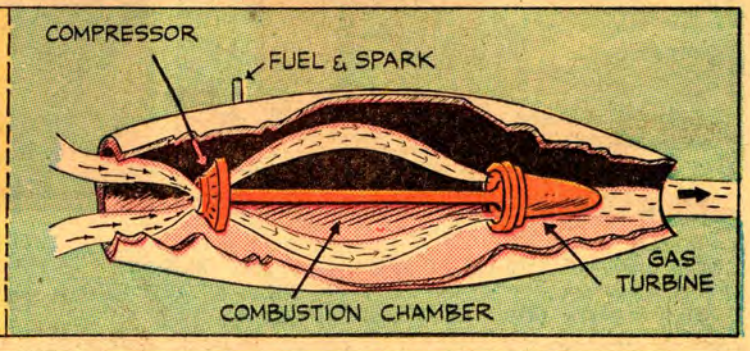


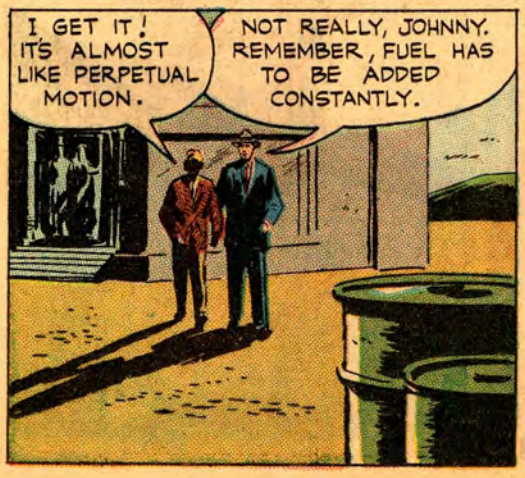
"IN THE COMBUSTION CHAMBER, FUEL IS MIXED WITH THIS COMPRESSED AIR AND BURNED. THIS **COMBUSTION** CREATES HOT, EXPANDING GASES WHICH BLAST OUT THROUGH THE **NOZZLE** AT THE TAIL-END WITH TERRIFIC FORCE. REACTION TO THIS STEADY JET PROPELS THE PLANE STEADILY FORWARD."



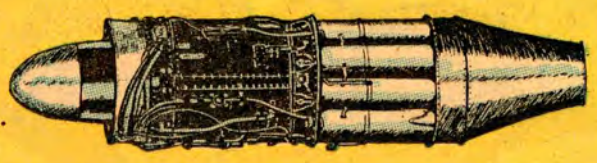


"YOU SEE, A **GAS TURBINE** IS ADDED AT THE REAR OF THE COMBUSTION CHAMBER. AS THE HOT GASES RUSH THROUGH, THEY PUSH PAST THE BLADES OF THIS TURBINE, TURNING THEM AS THE WIND TURNS A WINDMILL. THAT SPINNING TURBINE OPERATES THE COMPRESSOR THROUGH A DIRECT SHAFT."

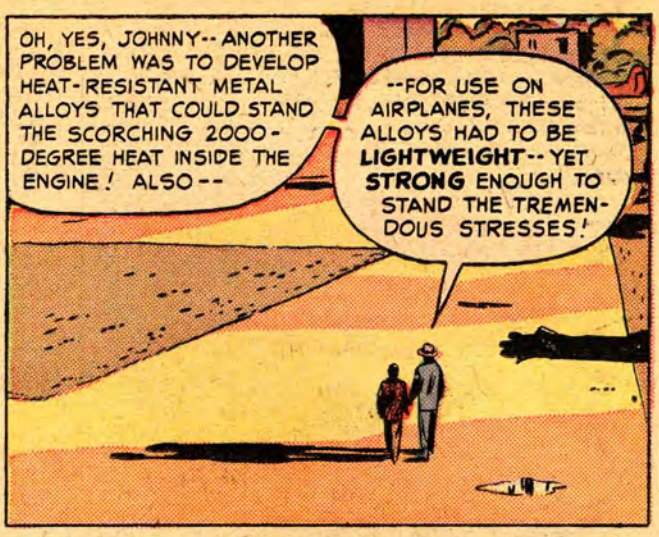


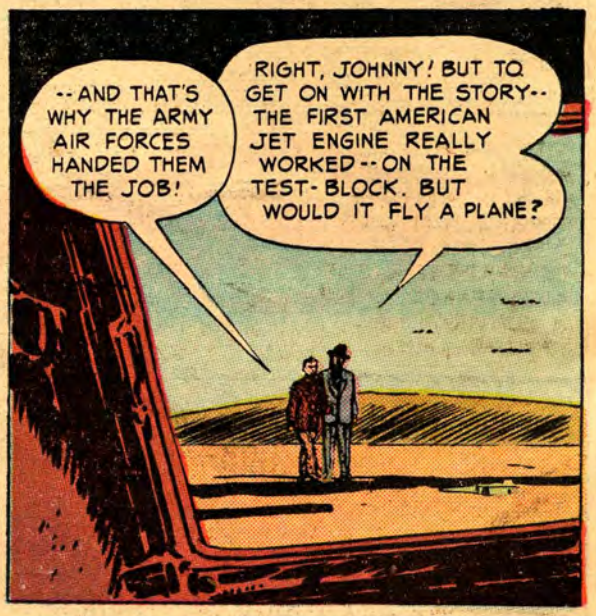


AND HERE'S THE WAY A MODERN ENGINE -- THE G.E. TURBOJET ACTUALLY LOOKS...

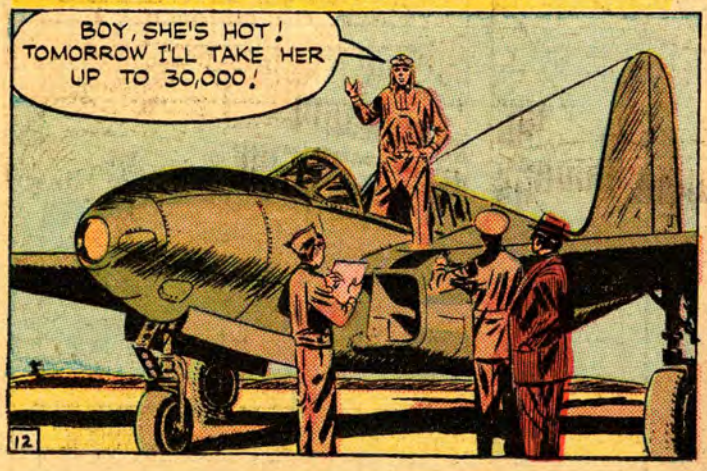


"IT HAS **MANY** COMBUSTION CHAMBERS -- BUT IT OPERATES ON THE SAME PRINCIPLE."

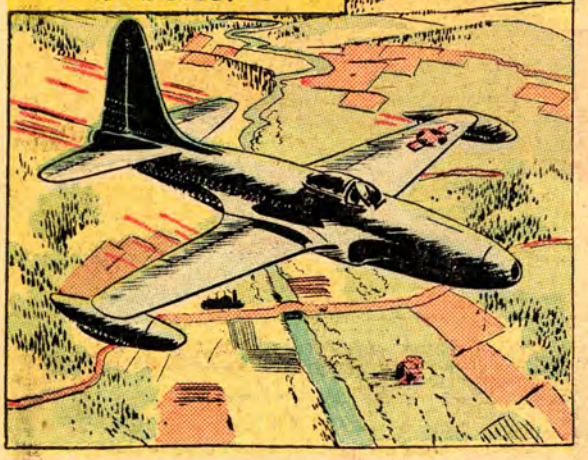




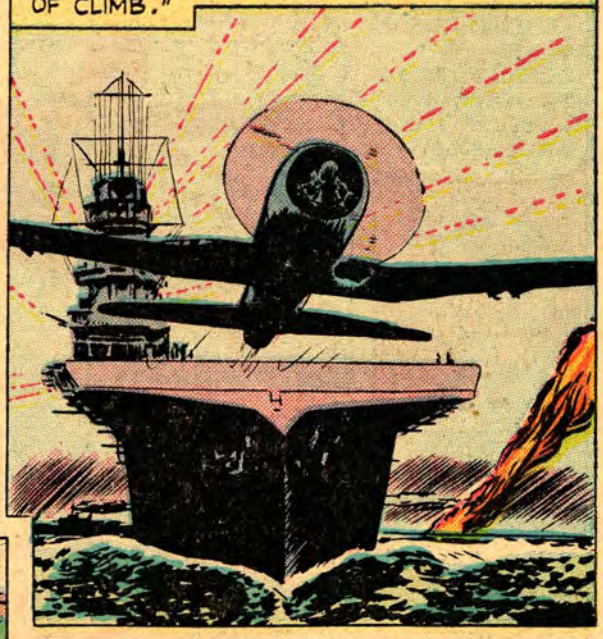
"THE ANSWER CAME IN OCTOBER, 1942, AT MUROC, CALIFORNIA. AN EXPERIMENTAL P-59 BELL AIRACOMET WAS READY FOR ITS FLIGHT TESTS..."



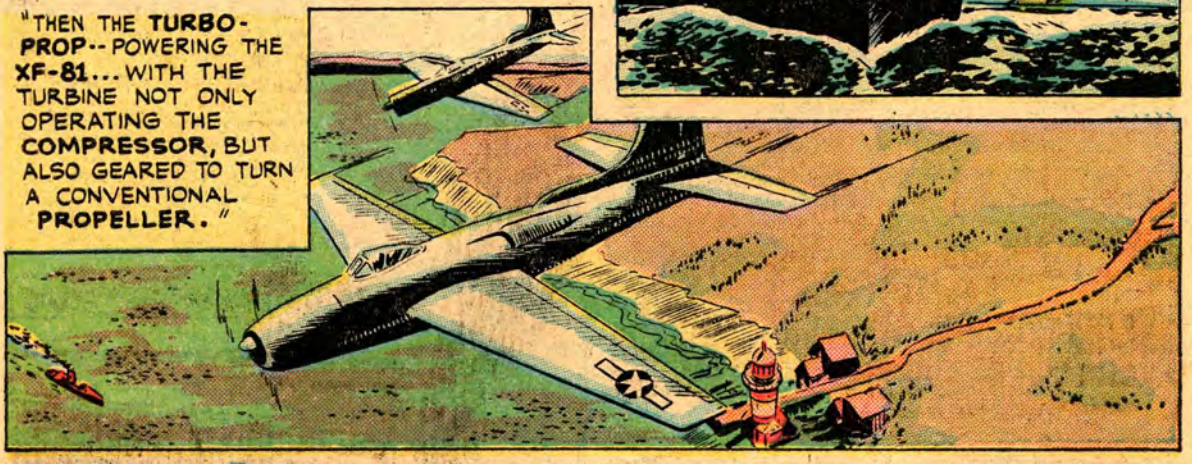
"THEN CAME OTHER TYPES--FAST AND FURIOUS,--THE LOCKHEED '**SHOOTING STAR**', OR F-80, WITH AN IMPROVED JET ENGINE. IT SET RECORD AFTER RECORD... COAST TO COAST IN 4½ HOURS... NEW YORK TO SCHENECTADY IN 17 MINUTES."



"A NEW KIND OF PLANE WAS DEVELOPED FOR THE NAVY... THE RYAN 'FR-1 FIREBALL'... A JET ENGINE **PLUS** A CONVENTIONAL-TYPE, WITH PROPELLER. DESIGNED AS A CARRIER-BASED FIGHTER, THE FIREBALL HAS A TERRIFIC RATE OF CLIMB."

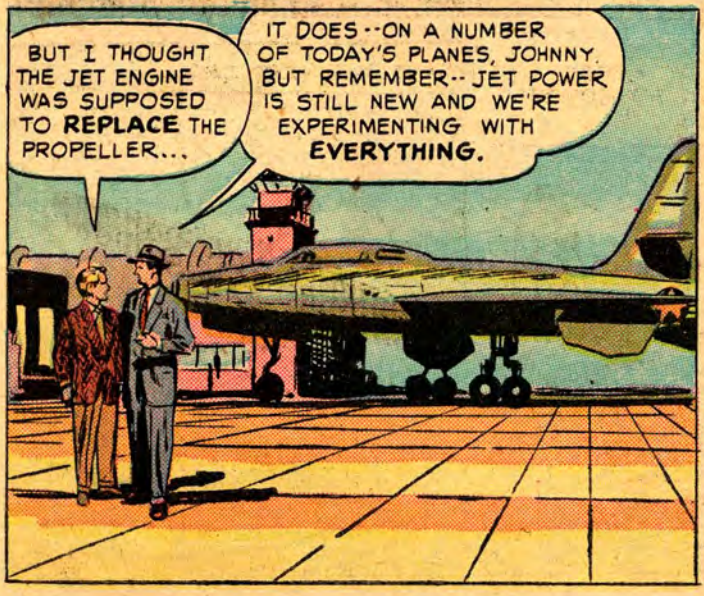


"THEN THE **TURBO-PROP**--POWERING THE **XF-81**... WITH THE TURBINE NOT ONLY OPERATING THE **COMPRESSOR**, BUT ALSO GEARED TO TURN A CONVENTIONAL **PROPELLER**."

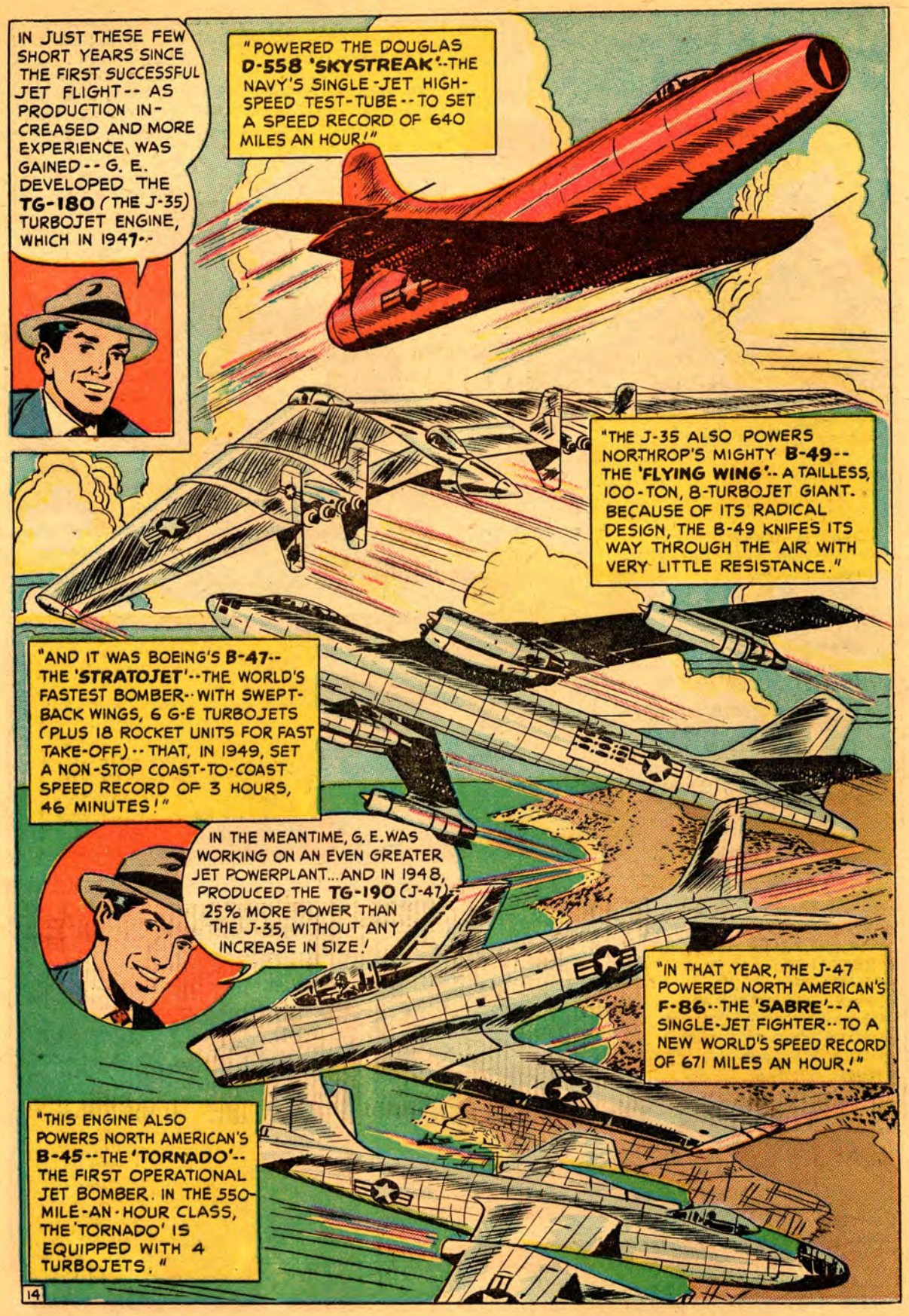


BUT I THOUGHT THE JET ENGINE WAS SUPPOSED TO **REPLACE** THE PROPELLER...

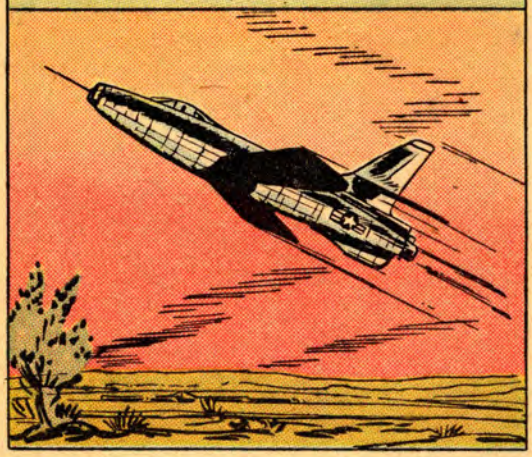
IT DOES--ON A NUMBER OF TODAY'S PLANES, JOHNNY. BUT REMEMBER--JET POWER IS STILL NEW AND WE'RE EXPERIMENTING WITH **EVERYTHING.**



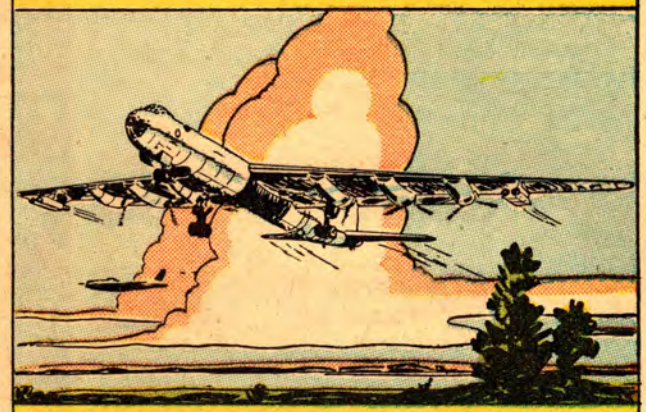
WE'LL PROBABLY ALWAYS USE PROPELLERS FOR CERTAIN PURPOSES, BUT **JETS** WILL BE USED MORE AND MORE AS THEY'RE DEVELOPED AND IMPROVED. FOR INSTANCE--


IN JUST THESE FEW SHORT YEARS SINCE THE FIRST SUCCESSFUL JET FLIGHT -- AS PRODUCTION INCREASED AND MORE EXPERIENCE WAS GAINED -- G. E. DEVELOPED THE TG-180 (THE J-35) TURBOJET ENGINE, WHICH IN 1947--
"POWERED THE DOUGLAS D-558 'SKYSTREAK'--THE NAVY'S SINGLE-JET HIGH-SPEED TEST-TUBE--TO SET A SPEED RECORD OF 640 MILES AN HOUR!"
"THE J-35 ALSO POWERS NORTHROP'S MIGHTY B-49-- THE 'FLYING WING'-- A TAILLESS, 100-TON, 8-TURBOJET GIANT. BECAUSE OF ITS RADICAL DESIGN, THE B-49 KNIFES ITS WAY THROUGH THE AIR WITH VERY LITTLE RESISTANCE."
"AND IT WAS BOEING'S B-47-- THE 'STRATOJET'--THE WORLD'S FASTEST BOMBER--WITH SWEPT-BACK WINGS, 6 G-E TURBOJETS (PLUS 18 ROCKET UNITS FOR FAST TAKE-OFF)--THAT, IN 1949, SET A NON-STOP COAST-TO-COAST SPEED RECORD OF 3 HOURS, 46 MINUTES!"
IN THE MEANTIME, G. E. WAS WORKING ON AN EVEN GREATER JET POWERPLANT... AND IN 1948, PRODUCED THE TG-190 (J-47) 25% MORE POWER THAN THE J-35, WITHOUT ANY INCREASE IN SIZE!
"IN THAT YEAR, THE J-47 POWERED NORTH AMERICAN'S F-86--THE 'SABRE'-- A SINGLE-JET FIGHTER--TO A NEW WORLD'S SPEED RECORD OF 671 MILES AN HOUR!"
"THIS ENGINE ALSO POWERS NORTH AMERICAN'S B-45--THE 'TORNADO'-- THE FIRST OPERATIONAL JET BOMBER. IN THE 550-MILE-AN-HOUR CLASS, THE 'TORNADO' IS EQUIPPED WITH 4 TURBOJETS."

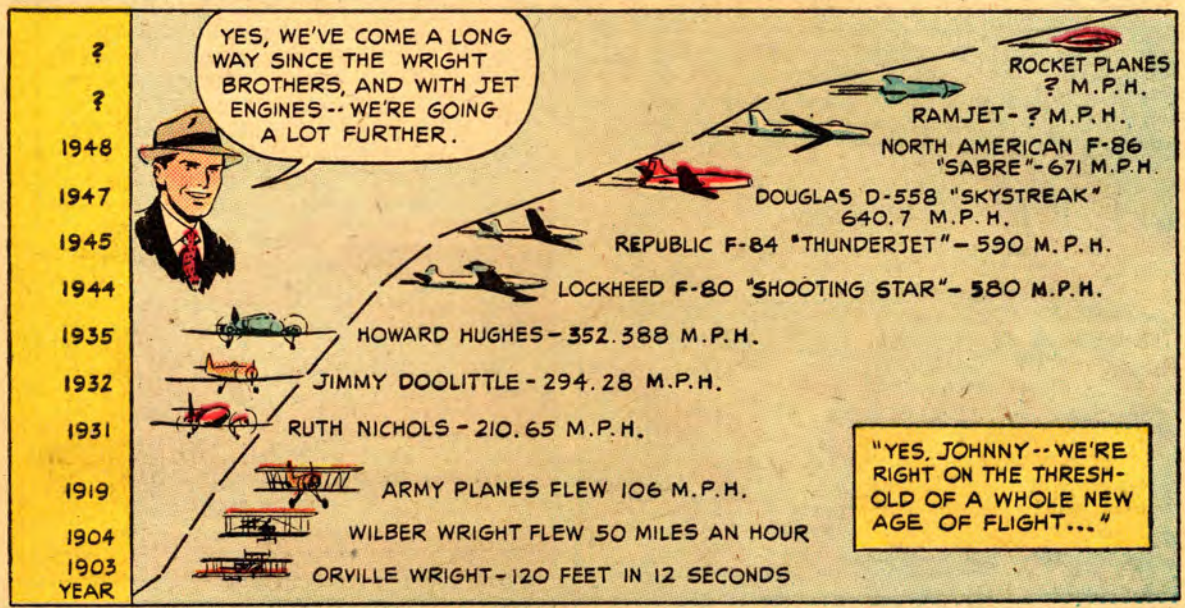
"AND REPUBLIC'S **XF-91** (ONE J-47 PLUS ROCKETS) -- THE HIGH-ALTITUDE AIR FORCE PLANE, DESIGNED TO INTERCEPT HIGH-SPEED BOMBERS AND MISSILES."



"CONSOLIDATED VULTEE'S **B-36D** IS THE WORLD'S LARGEST AND LONGEST-RANGE BOMBER...



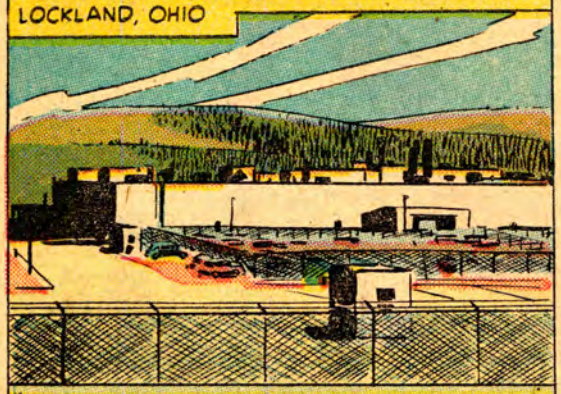
"THE B-36D CARRIES 4 J-47'S SUSPENDED BENEATH THE WINGS, IN ADDITION TO THE 6 PISTON ENGINES."



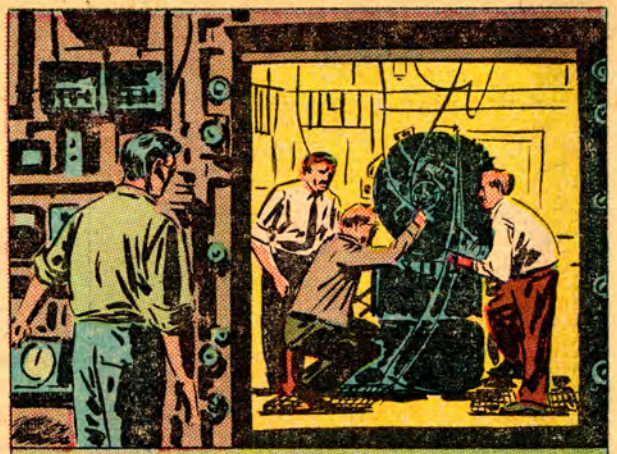
"BEHIND THE DOORS OF G.E.'S PLANT AT LYNN, MASSACHUSETTS -- WHERE TURBOSUPERCHARGERS FOR MILITARY AND COMMERCIAL AIRCRAFT ARE ALSO MADE -- JET ENGINES ROLL OFF THE PRODUCTION LINE IN A STEADY STREAM...

"... WHILE THE RESEARCH ENGINEERS EXPERIMENT WITH THE JET ENGINES OF TOMORROW."

"TO MEET THE AVIATION INDUSTRY'S GREAT DEMAND FOR J-47'S, A NEW MANUFACTURING IDEA CAME INTO BEING -- G. E.'S PLANT AT LOCKLAND, OHIO

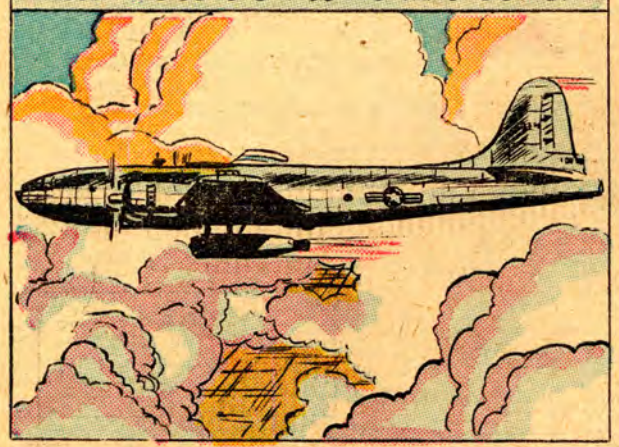


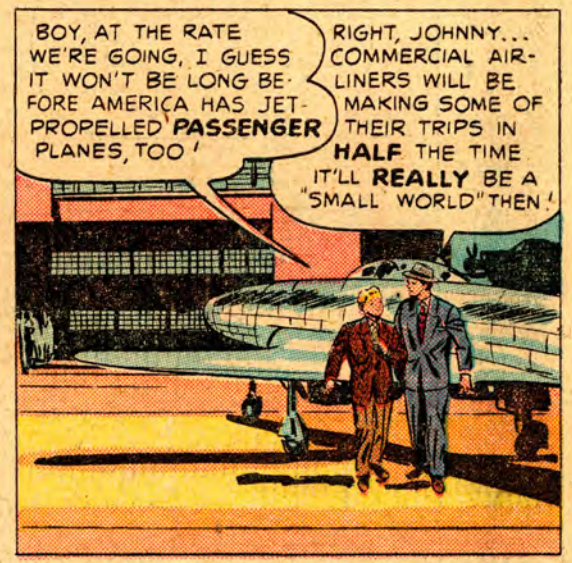
"MORE THAN 200 MANUFACTURERS FROM ALL OVER THE COUNTRY SHIP THE ENGINE PARTS TO LOCKLAND FOR ASSEMBLY AND TESTING!"

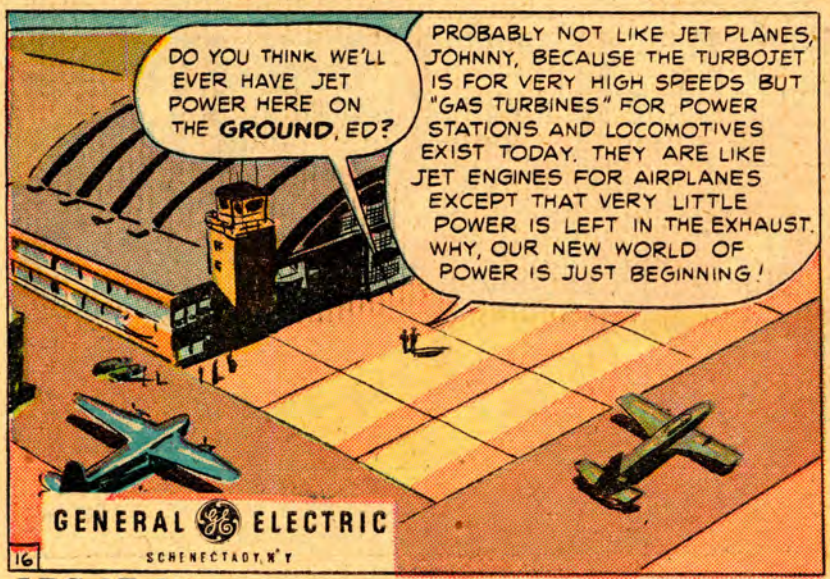


"BEHIND THE THICK WALLS OF THE TEST CELLS, THE POWERFUL TURBOJETS ARE TESTED--AND **RE**-TESTED BY SKILLED TECHNICIANS WHO HAVE ONLY ONE STANDARD: PERFECT PERFORMANCE."

"THE FINAL TEST, OF COURSE, IS PERFORMANCE **IN THE AIR** THIS SLEEK B 29 ACTS AS A 'FLYING TEST BED' FOR NEW ENGINES, WHICH ARE SUSPENDED THROUGH THE BOMB-BAY DURING TRIAL FLIGHTS."







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