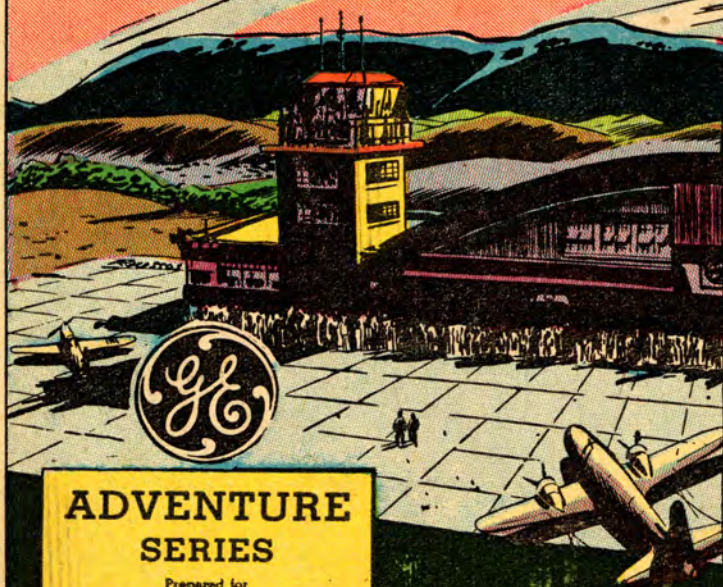


ADVENTURES IN JET PROPULSION



**ADVENTURE
SERIES**

Prepared for
GENERAL ELECTRIC COMPANY
By GENERAL COMICS, Inc.

CONCEIVED CENTURIES AGO... BORN IN THE STRESS AND STRUGGLE OF A GREAT WAR... JET ENGINES WILL SEND THE PLANES AND SHIPS OF THE FUTURE RACING ALONG WITH UNMATCHED SPEED AND POWER. EVEN NOW, PLANES POWERED BY JET ENGINES CARRY MEN THROUGH THE AIR FASTER THEN EVER BEFORE. THE TRUE STORY OF THE BIRTH OF JET PROPULSION PROVES AGAIN THAT FACTS ARE SOMETIMES MORE THRILLING THAN FICTION. THERE WERE TRIALS AND TROUBLES APLENTY... AND A DESPERATE FIGHT AGAINST TIME... AS SKILL AND COURAGE STRUGGLED TO CREATE...
"THE PLANE OF TOMORROW!"

AS A JET PLANE FLASHES PAST JOHNNY POWERS AND HIS SCIENTIST BROTHER, ED...

ZING! NO WONDER THEY CALL IT A "SHOOTING STAR!"

YES, JOHNNY, IT'S SHOOTING ALONG AT ALMOST 600 MILES AN HOUR!



BEAUTIFUL SIGHT, ISN'T IT? BUT WHAT A WHALE OF A LOT OF TROUBLE WE HAD BEFORE WE FINALLY MADE JET PROPULSION WORK!

WHAT DO YOU MEAN "FINALLY?" YOU TALK AS THOUGH THE IDEA WAS A THOUSAND YEARS OLD.



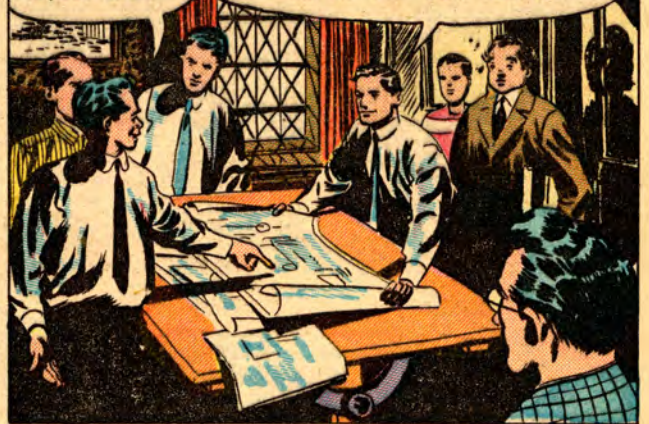
IN THAT YEAR, A YOUNG ENGLISH INVENTOR ENTERED CAMBRIDGE TO CONTINUE HIS RESEARCH ON A 'PROPELLERLESS AIRCRAFT'.

ACTUALLY ALMOST TWO THOUSAND, JOHNNY. BUT IT WAS ONLY A DREAM FOR MANY CENTURIES. THE STORY OF THE MEN WHO MADE THAT DREAM A REALITY BEGAN IN 1933...



LOOKS LIKE A FLIGHT OF THE IMAGINATION TO ME, OLD CHAP.

I TELL YOU IT CAN BE DONE. AND SOMEDAY I'LL FIND A MANUFACTURER WITH ENOUGH VISION TO HAVE A GO AT MY JET PLANE.



YEAR AFTER YEAR, THE YOUNG INVENTOR STRUGGLED TO PERFECT HIS ENGINE, AND THEN CAME WAR AND THE DEVELOPMENT OF JET POWER BECAME URGENT!

STILL HAVING TROUBLE?

I'M CERTAIN I'M ON THE RIGHT TRACK, SIR; BUT IT WILL TAKE TIME.

NOT TOO MUCH, I HOPE. YOUR WORK IS A VITAL PART OF THE WAR EFFORT. YOU MUST SUCCEED.



"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..."

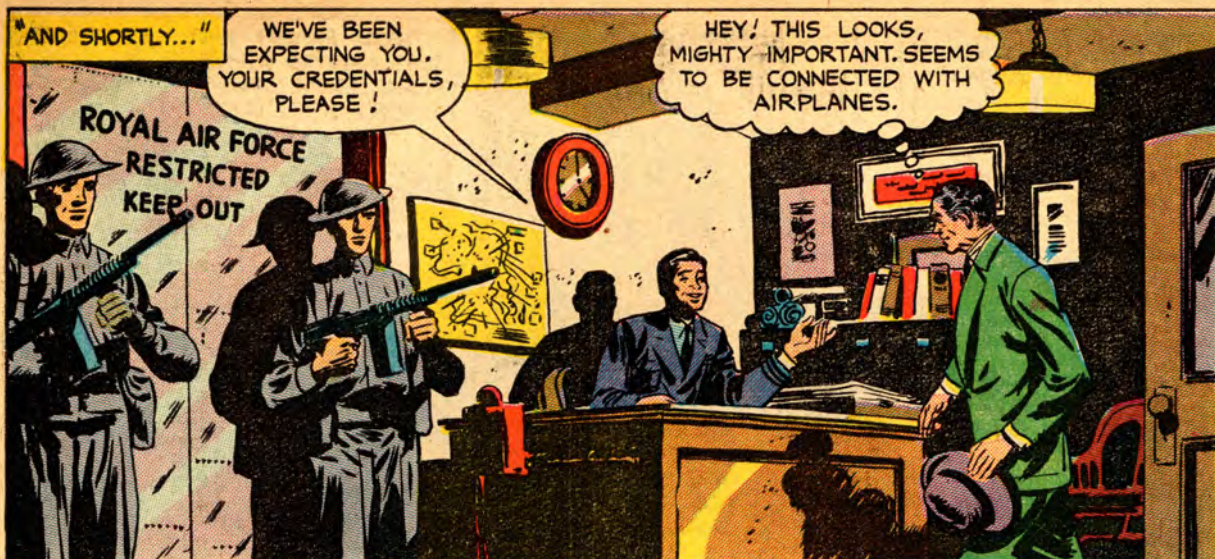


AH, HERE'S THE
AMERICAN ENGINEER
NOW...

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!



"AND SHORTLY..."

WE'VE BEEN EXPECTING YOU. YOUR CREDENTIALS, PLEASE!

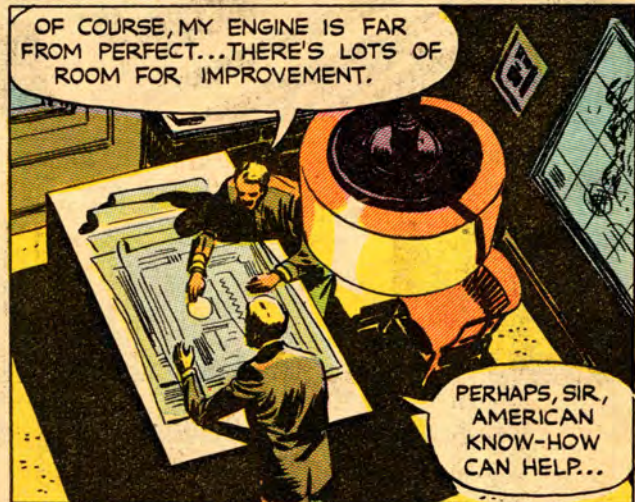
HEY! THIS LOOKS, MIGHTY IMPORTANT. SEEMS TO BE CONNECTED WITH AIRPLANES.

ROYAL AIR FORCE
RESTRICTED
KEEP OUT

"HE WAS RIGHT ON BOTH COUNTS..."



I MUST WARN YOU, SIR, OF THE ABSOLUTE SECRECY OF THIS WORK. HERE IS MY DESIGN FOR A JET ENGINE...IF WE SUCCEED, IT WILL MEAN A TURNING POINT IN AERIAL WARFARE!



OF COURSE, MY ENGINE IS FAR FROM PERFECT...THERE'S LOTS OF ROOM FOR IMPROVEMENT.

PERHAPS, SIR, AMERICAN KNOW-HOW CAN HELP...



I UNDERSTAND, BY THE WAY, THAT THE NAZIS ARE ALSO EXPERIMENTING WITH JET.

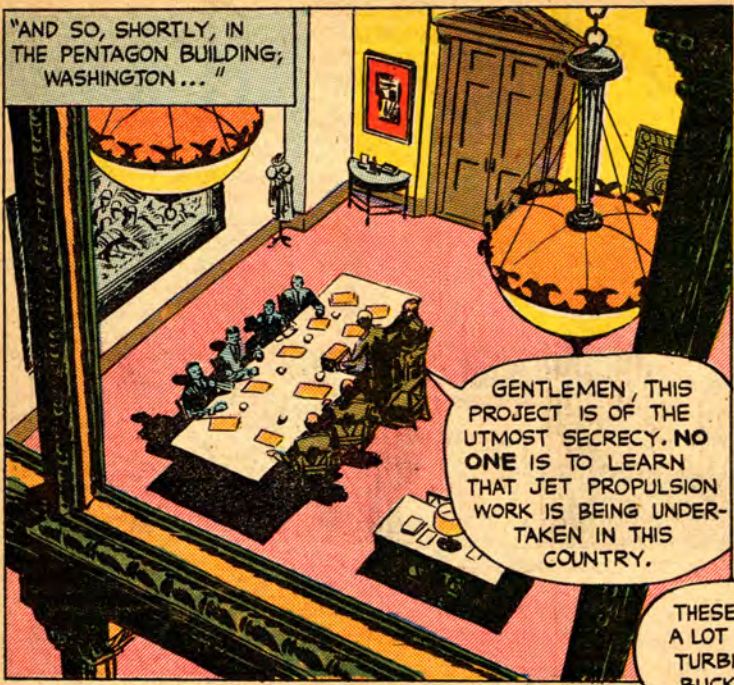
UNFORTUNATELY, THEY ARE, BUT WE MUST BEAT THEM TO IT.



THAT IS WHY, SIR, YOU WON'T BE ABLE TO TAKE THESE DRAWINGS WITH YOU WHEN YOU RETURN BY CLIPPER TO THE STATES.

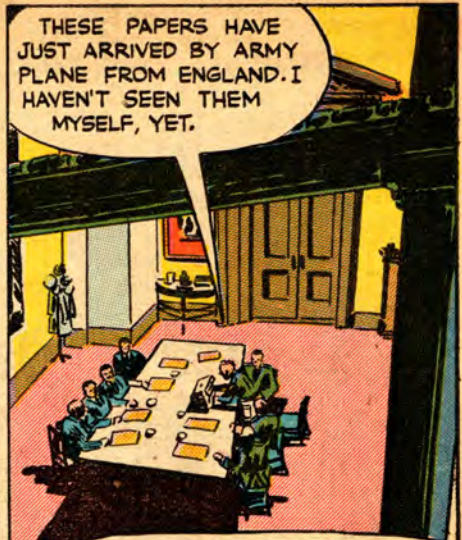
I UNDERSTAND... MY TRIP HOME WILL TAKE ME THROUGH SPY-RIDDEN COUNTRY... WE CAN'T AFFORD TO RISK IT!

"AND SO, SHORTLY, IN THE PENTAGON BUILDING, WASHINGTON..."



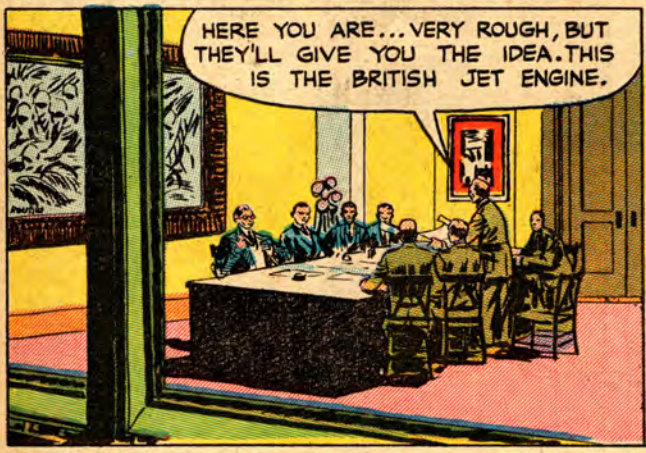
GENTLEMEN, THIS PROJECT IS OF THE UTMOST SECRECY. NO ONE IS TO LEARN THAT JET PROPULSION WORK IS BEING UNDERTAKEN IN THIS COUNTRY.

THESE PAPERS HAVE JUST ARRIVED BY ARMY PLANE FROM ENGLAND. I HAVEN'T SEEN THEM MYSELF, YET.

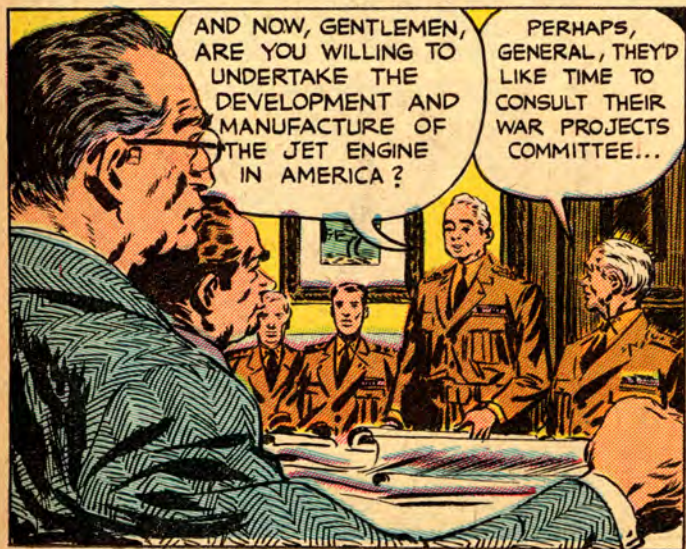


EXACTLY! THAT'S WHY WE'VE COME TO YOUR COMPANY FOR HELP. OF COURSE, YOU PEOPLE ARE PRIMARILY CONCERNED WITH ELECTRICITY, BUT WE NEED THE BENEFIT OF YOUR EXPERIENCE WITH THE STEAM TURBINE AND SUPERCHARGER.

THESE ARE A LOT LIKE TURBINE BUCKETS!



HERE YOU ARE... VERY ROUGH, BUT THEY'LL GIVE YOU THE IDEA. THIS IS THE BRITISH JET ENGINE.



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!"

"SOON, IN THE G-E PLANT AT LYNN, FIVE KEY ENGINEERS ARE PULLED OFF TURBO SUPERCHARGER 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 ?

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 !



JUST ONE, SIR...HOW SOON CAN WE START ?

"THOSE MEN REALLY DID GET BUSY, TOO. IN JUST A FEW WEEKS THEY HAD COMPLETED DESIGNS FOR SEVERAL DIFFERENT PARTS OF THE ENGINE..."

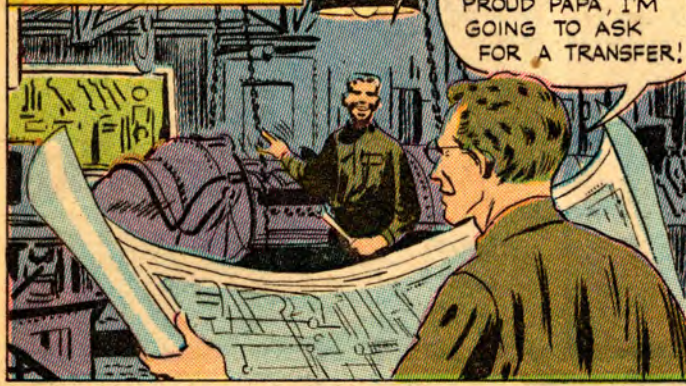
JUST LOOK AT HER, TOM ! ISN'T SHE BEAUTIFUL ?

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 ?





HEY, WHAT ARE ALL THOSE CIVILIANS DOING OUT THERE?

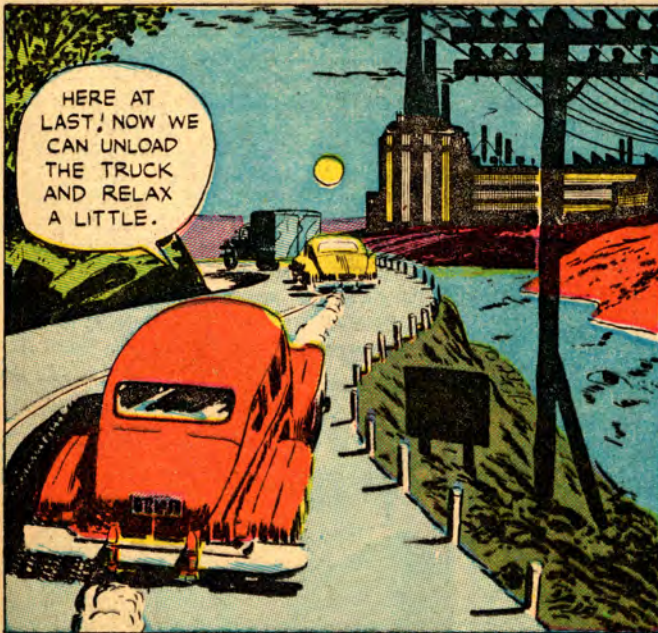
LOOKS LIKE THEY'RE PUTTING A SMOKE-SCREEN AROUND THE PLANE. THEY MUST THINK WE'RE NOSEY!



"THE M.P.'S DIDN'T LIKE IT, BUT THE SECRECY WAS FOR THEIR OWN GOOD. THAT PLANE WAS CARRYING UNASSEMBLED PARTS OF THE BRITISH EXPERIMENTAL ENGINE... AND THOSE CIVILIANS WERE GUARDS."

EASY NOW... GET THOSE BUNDLES OUT AND INTO THE TRUCKS, BOYS... BUT FAST!

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



HERE AT LAST, NOW WE CAN UNLOAD THE TRUCK AND RELAX A LITTLE.



EVENING, FRANK. STILL BIG DOINGS INSIDE, I SEE...

BIGGER THAN EVER...THEY'VE GOT TWO OF US NOW.

"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..."

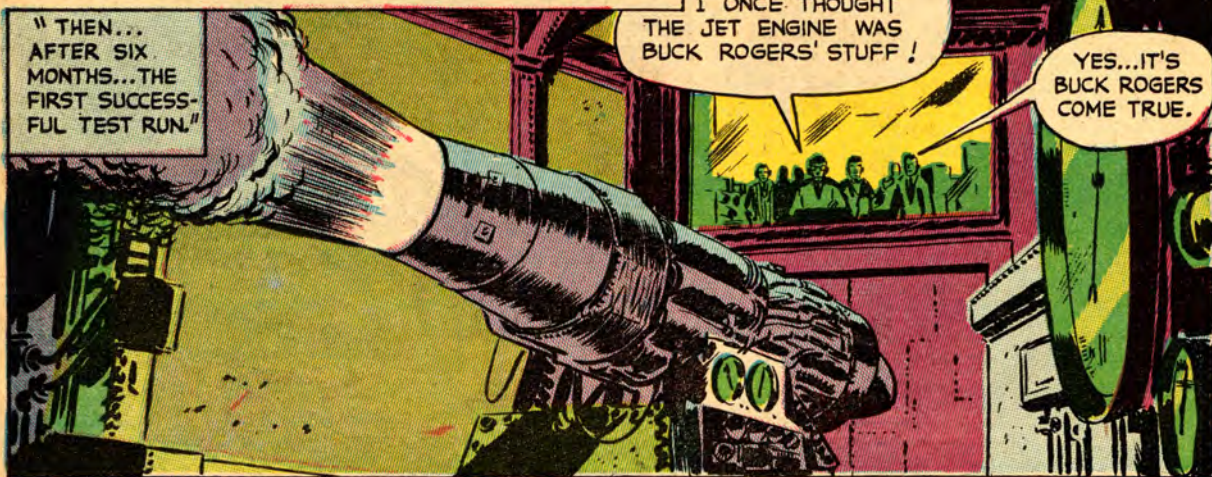
IT ISN'T THAT I'M NOT INTERESTED IN MY HUSBAND'S WORK... HE JUST WON'T TALK ABOUT IT!



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

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

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

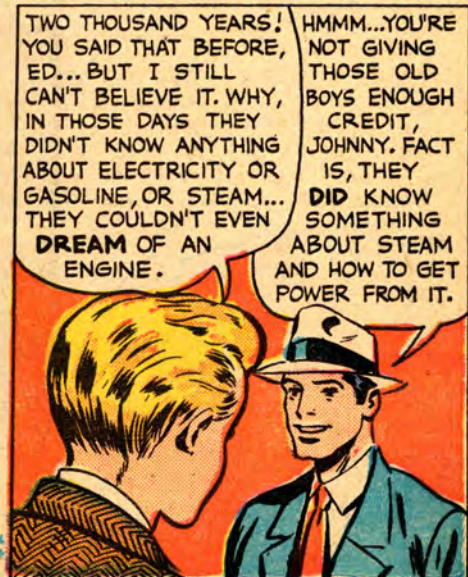
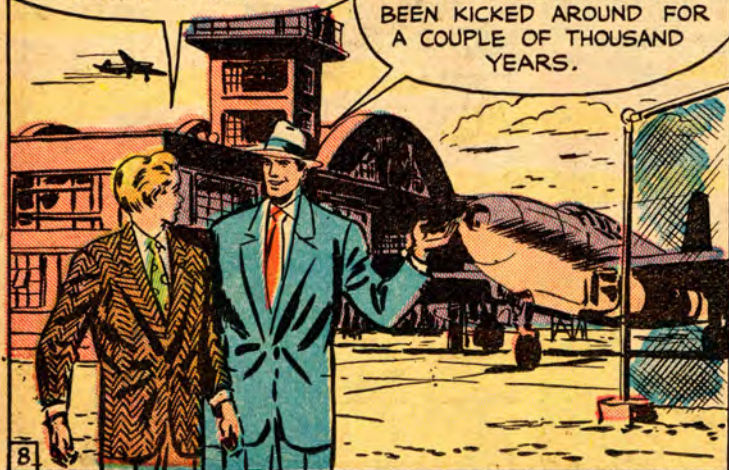


GOSH, ED, IT WOULD HAVE BEEN TOO BAD IF THE NAZIS FOUND OUT HOW THAT ENGINE WORKED.

THE NAZIS DID KNOW HOW IT WORKED, JOHNNY...THAT IS, THEY HAD THE GENERAL IDEA-AN IDEA THAT HAD BEEN KICKED AROUND FOR A COUPLE OF THOUSAND YEARS.

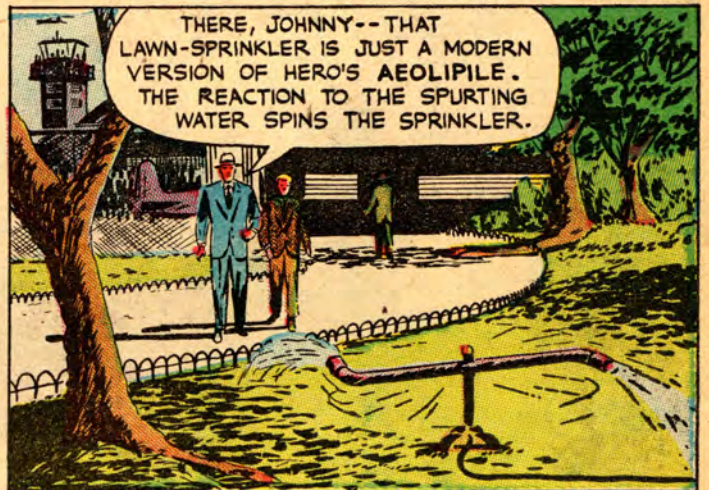
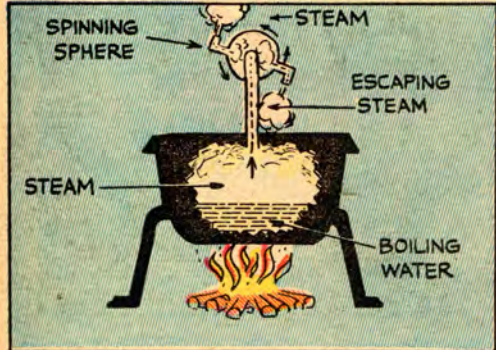
TWO THOUSAND YEARS! YOU SAID THAT BEFORE, ED... BUT I STILL CAN'T BELIEVE IT. WHY, IN THOSE DAYS THEY DIDN'T KNOW ANYTHING ABOUT ELECTRICITY OR GASOLINE, OR STEAM... THEY COULDN'T EVEN DREAM OF AN ENGINE.

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.





"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."

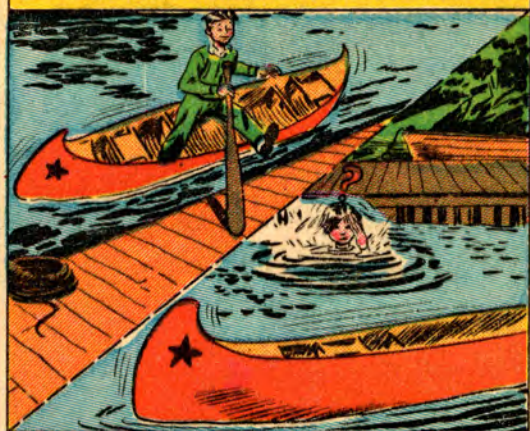


"THE IDEA'S SIMPLE, JOHNNY. BLOW UP A BALLOON LIKE THIS ONE... AND WHEN YOU LET IT GO..."



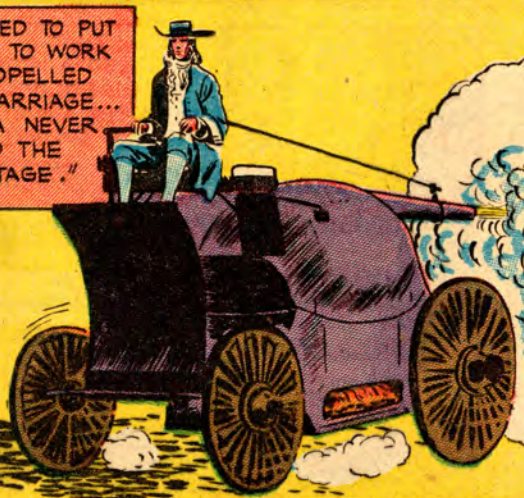
THE AIR SHOOTS OUT IN ONE DIRECTION THROUGH THE OPENING... AND THE REACTION PUSHES THE BALLOON IN THE OPPOSITE DIRECTION.

"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..."



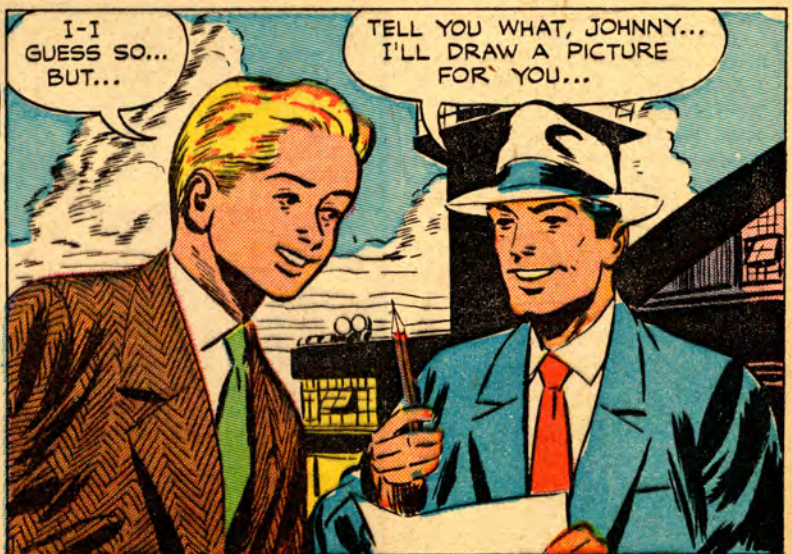
SURE, I GET IT... BUT A MODERN JET ENGINE DOESN'T GET ITS POWER FROM STEAM PRESSURE, DOES IT?

NO, JOHNNY. TODAY, JET GETS ITS POWER FROM THE HOT EXPANDING GASES PRODUCED BY THE CONTINUOUS BURNING FUEL. GET IT?

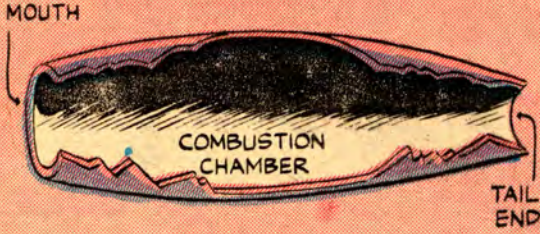


I-I GUESS SO... BUT...

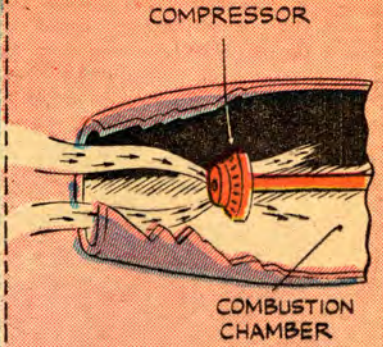
TELL YOU WHAT, JOHNNY... I'LL DRAW A PICTURE FOR YOU...



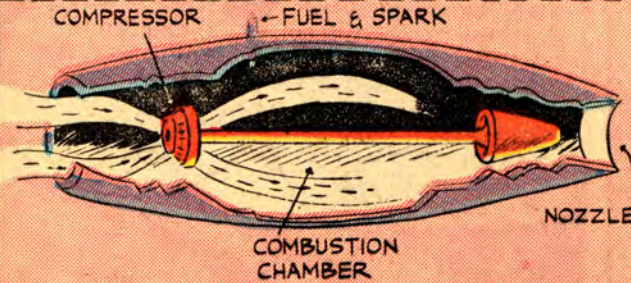
"FIRST, WE'LL START WITH THE SHELL OF THE WHOLE ENGINE... PRACTICALLY A BIG COMBUSTION CHAMBER."



"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."

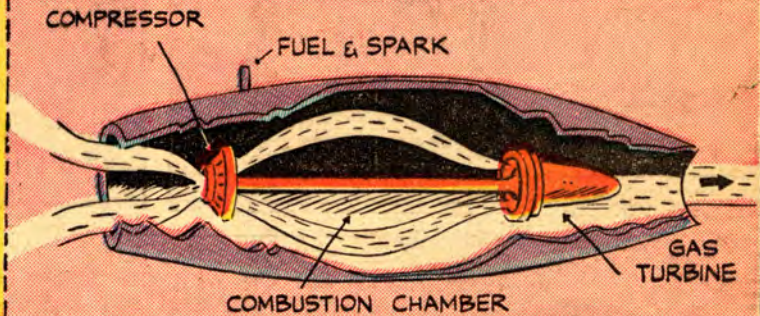


SURE... NEWTON'S THEORY. BUT WHAT TURNS THE COMPRESSOR?

THAT, JOHNNY, WAS ONE OF OUR PROBLEMS.



"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."

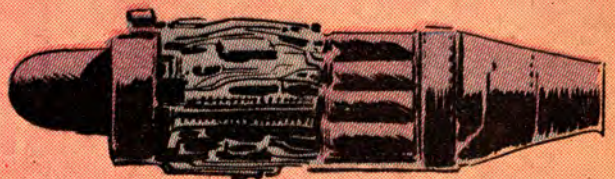


I GET IT! IT'S ALMOST LIKE PERPETUAL MOTION.

NOT REALLY, JOHNNY. REMEMBER, FUEL HAS TO BE ADDED CONSTANTLY.



"AND HERE'S THE WAY THIS ENGINE -- THE G.E. TURBOJET -- ACTUALLY LOOKS... THE SAME PRINCIPLE BUT WITH A NUMBER OF COMBUSTION CHAMBERS."



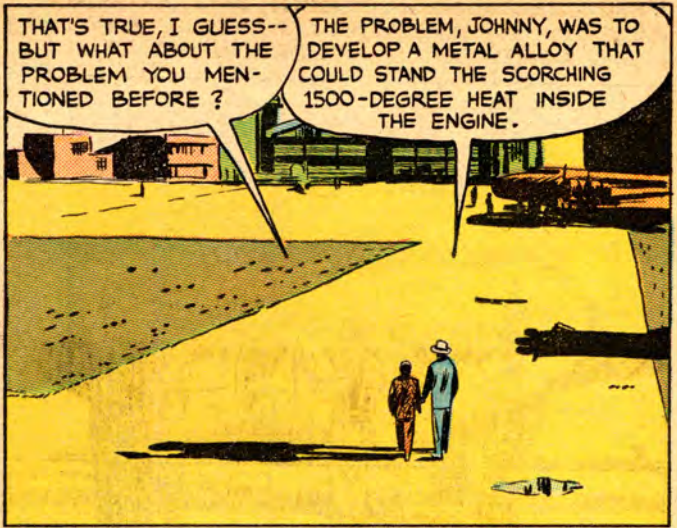
WOW! YOUR EXPLANATION WAS SIMPLE, ED, BUT THE REAL ENGINE LOOKS AWFULLY COMPLICATED!

YES, JOHNNY, BUT THAT JET ENGINE HAS JUST THOSE SAME BASIC PARTS-- COMPRESSOR, COMBUSTION CHAMBERS, TURBINE AND NOZZLE. SIMPLE, COMPARED TO THE 11,000 PARTS IN A CONVENTIONAL AIRPLANE ENGINE.



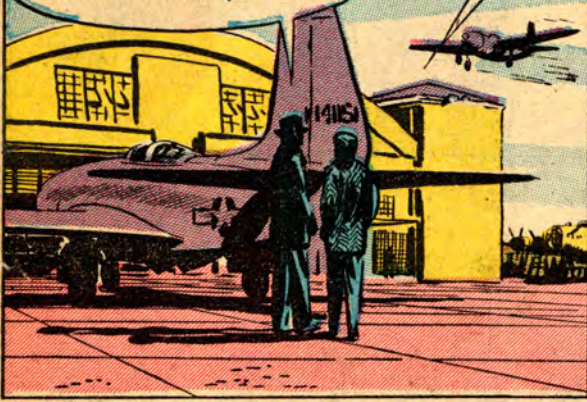
THAT'S TRUE, I GUESS-- BUT WHAT ABOUT THE PROBLEM YOU MENTIONED BEFORE?

THE PROBLEM, JOHNNY, WAS TO DEVELOP A METAL ALLOY THAT COULD STAND THE SCORCHING 1500-DEGREE HEAT INSIDE THE ENGINE.



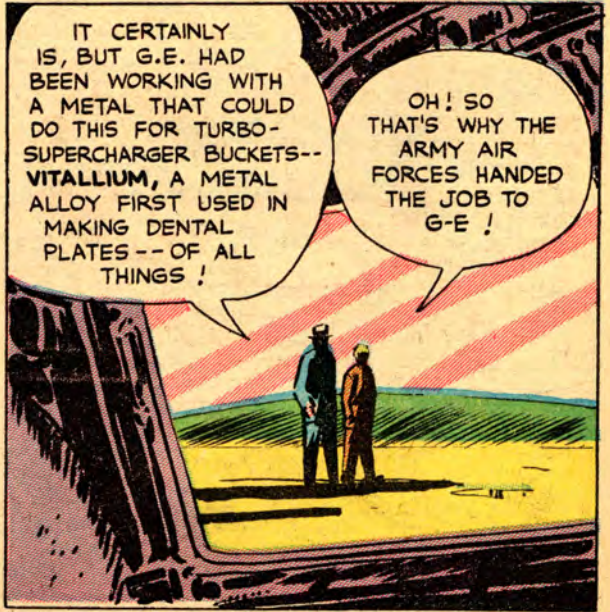
IT HAD TO BE HEAT-RESISTANT SO THAT IT WOULDN'T MELT IN THIS TERRIFIC HEAT... IT HAD TO BE EXTRA LIGHTWEIGHT FOR USE IN AIRPLANES... AND IT HAD TO BE STRONG ENOUGH TO STAND THE TREMENDOUS PRESSURE.

BOY! THAT'S A LOT TO EXPECT FROM ONE METAL!

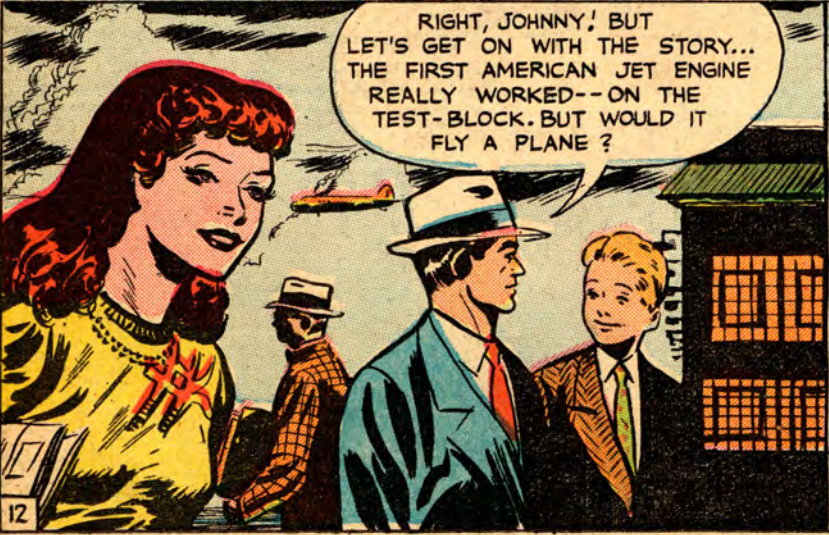


IT CERTAINLY IS, BUT G.E. HAD BEEN WORKING WITH A METAL THAT COULD DO THIS FOR TURBO-SUPERCHARGER BUCKETS-- VITALLIUM, A METAL ALLOY FIRST USED IN MAKING DENTAL PLATES-- OF ALL THINGS!

OH! SO THAT'S WHY THE ARMY AIR FORCES HANDED THE JOB TO G-E!

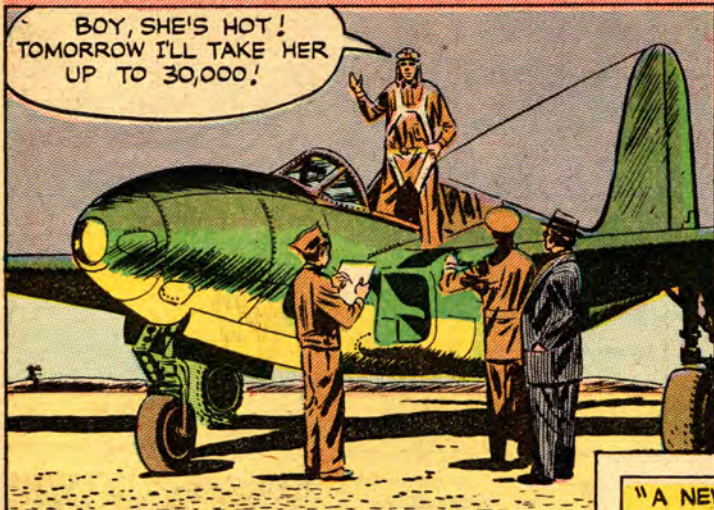
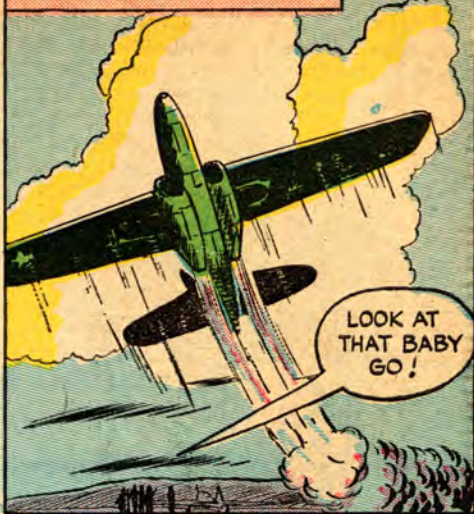


RIGHT, JOHNNY! BUT LET'S GET ON WITH THE STORY... THE FIRST AMERICAN JET ENGINE REALLY WORKED-- ON THE TEST-BLOCK. BUT WOULD IT FLY A PLANE?

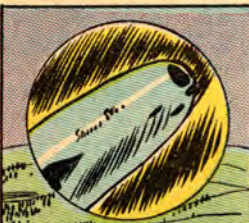


"THE ANSWER CAME IN OCTOBER, 1942, AT MURROCK, CALIFORNIA. AN EXPERIMENTAL P-59 BELL AIRACOMET WAS READY FOR ITS FLIGHT TESTS..."

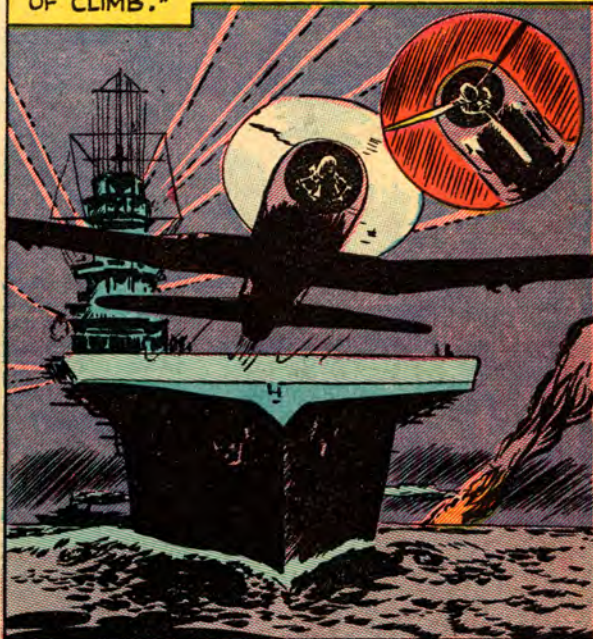
"AND THE NEXT DAY..."



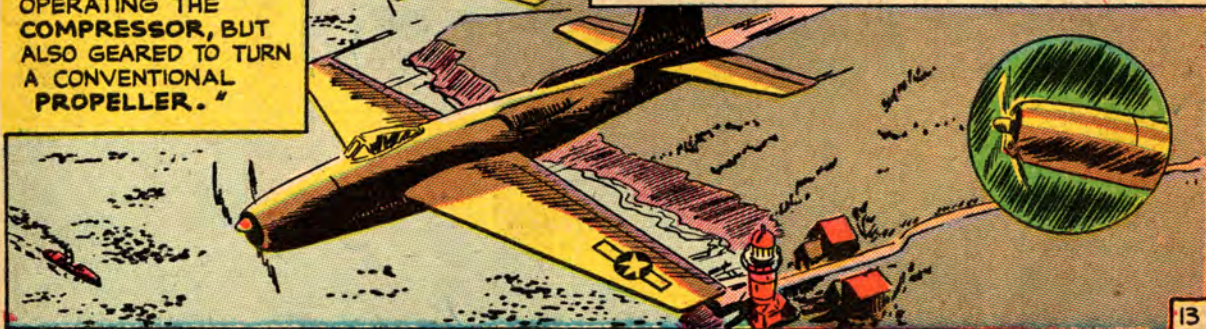
"THEN CAME OTHER TYPES-- FAST AND FURIOUS!-- THE LOCKHEED 'SHOOTING STAR', OR P-80, WITH AN IMPROVED JET ENGINE. IT SET RECORD AFTER RECORD... COAST TO COAST IN 4½ HOURS... NEW YORK TO SCHENECTADY IN 17 MINUTES."

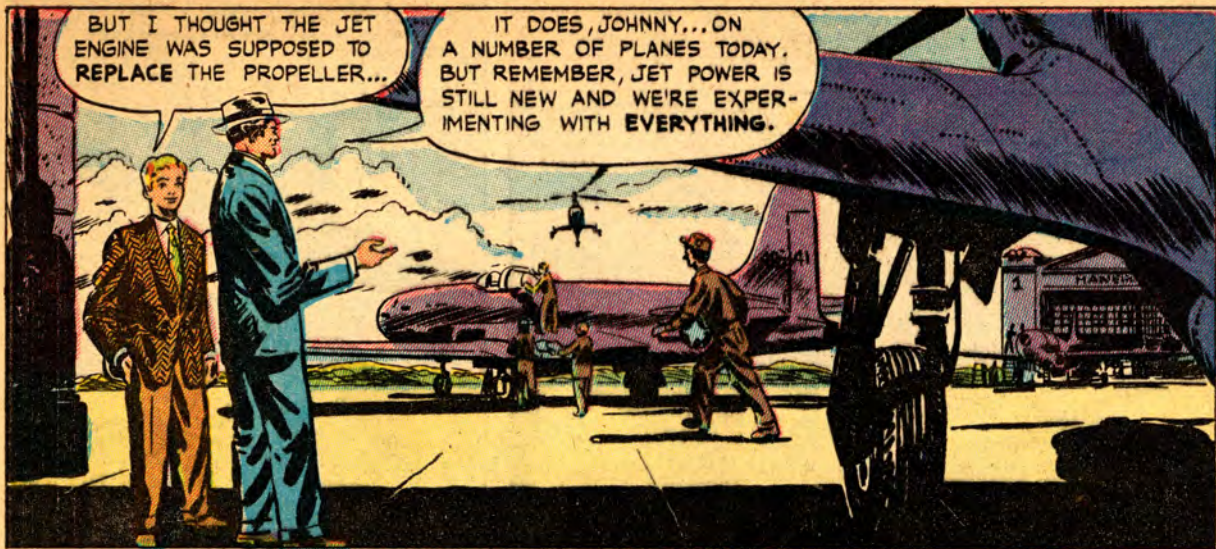


"A NEW KIND OF PLANE WAS DEVELOPED FOR THE NAVY... THE RYAN 'FR-1 FIREBALL'... JET PLUS A CONVENTIONAL-TYPE ENGINE WITH PROPELLER. DESIGNED AS A CARRIER-BASED FIGHTER, THE FIREBALL HAS A TERRIFIC RATE OF CLIMB."



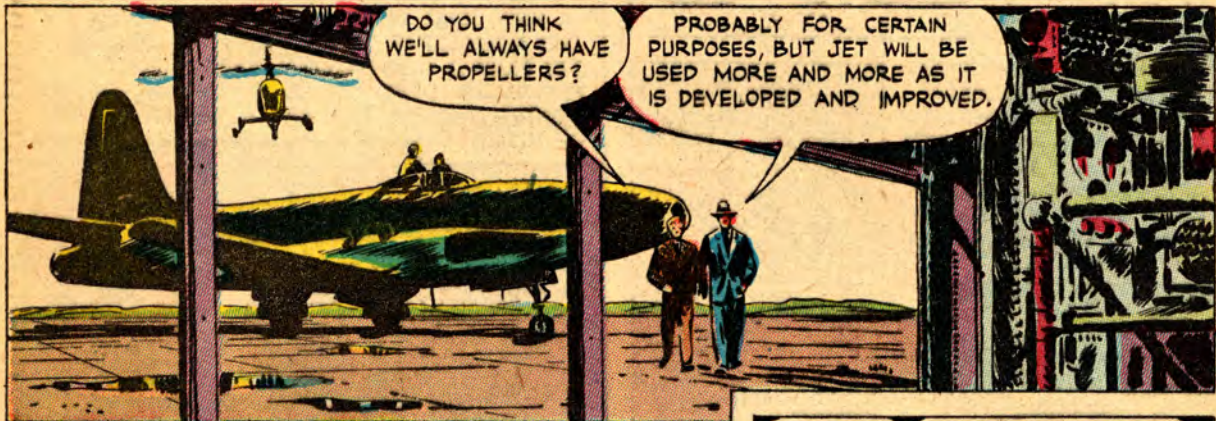
"THEN ANOTHER ENGINE... THE PROJET OR THE XP-81... WITH THE TURBINE NOT ONLY OPERATING THE COMPRESSOR, BUT ALSO GEARED TO TURN A CONVENTIONAL PROPELLER."





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

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



DO YOU THINK WE'LL ALWAYS HAVE PROPELLERS?

PROBABLY FOR CERTAIN PURPOSES, BUT JET WILL BE USED MORE AND MORE AS IT IS DEVELOPED AND IMPROVED.



GEE! WITH SO MUCH IN ITS FAVOR, NO WONDER SO MANY PEOPLE ARE EXPERIMENTING WITH JET.

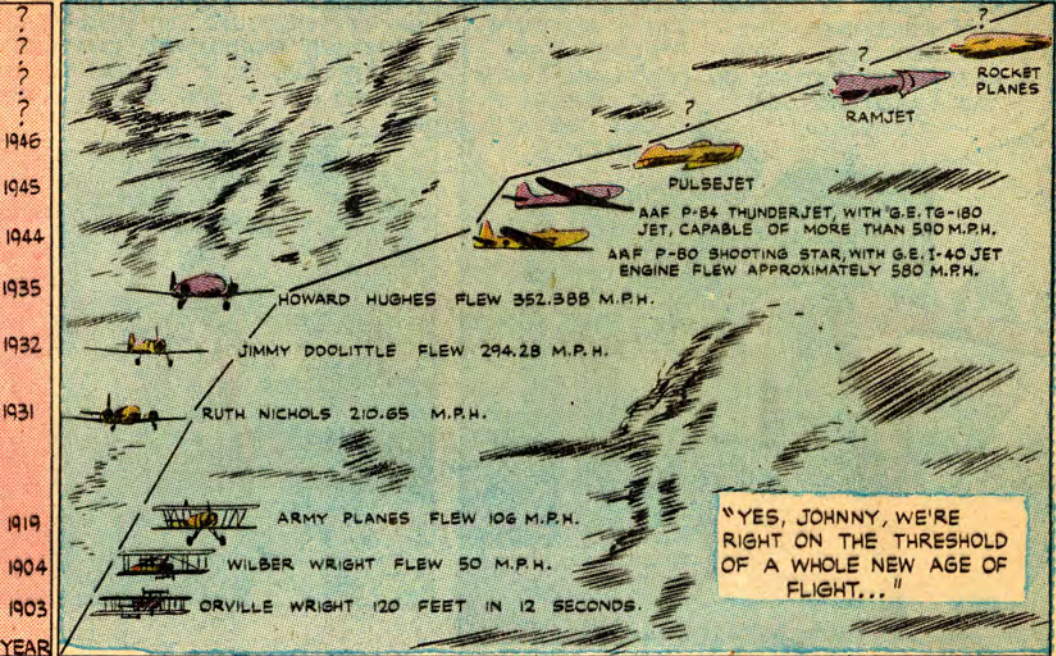
YES, THEY'RE WORKING ON LARGER, MORE POWERFUL JET ENGINES ALL THE TIME - LIKE THE THUNDER JET - AND STILL OTHER TYPES LIKE PULSEJET AND RAMJET - DIFFERENT IN OPERATION BUT ALL BASED ON NEWTON'S THIRD LAW OF MOTION.



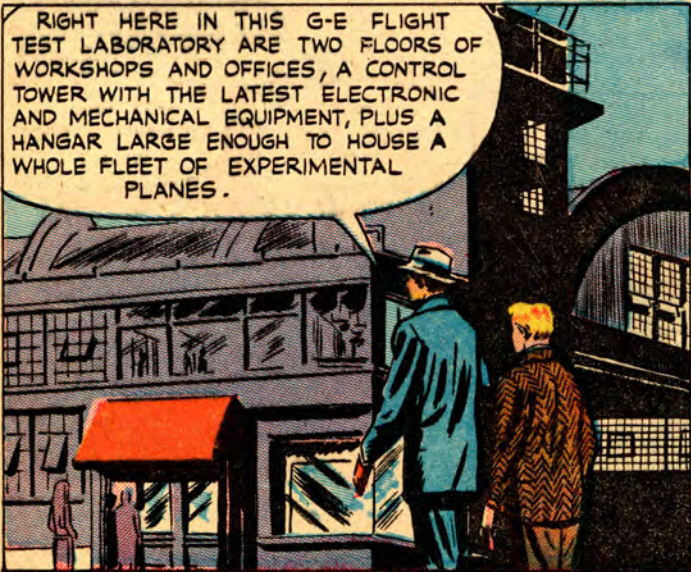
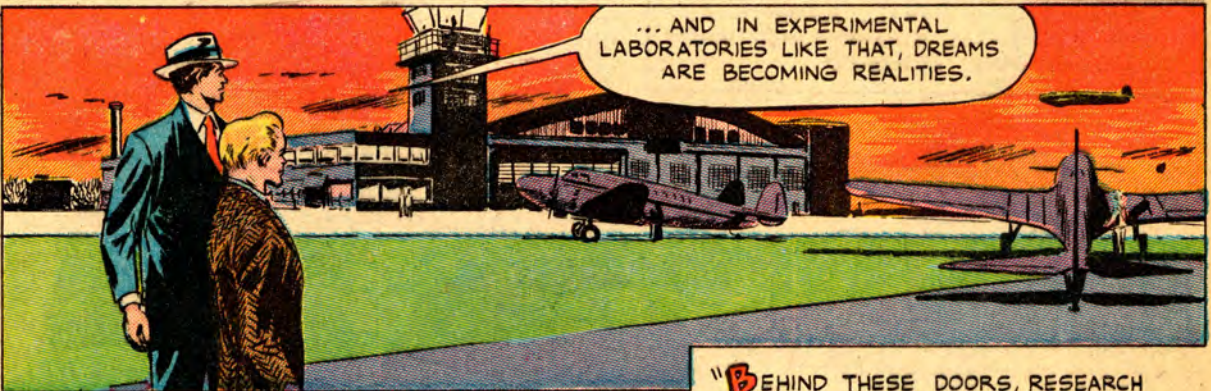
HEY! HOW ABOUT ROCKETS?

A GOOD POINT, JOHNNY. ROCKETS OPERATE ON NEWTON'S LAW, TOO, BUT THEY CARRY THEIR OWN OXYGEN, WHILE THE JET ENGINES ARE TALKING ABOUT DRAW OXYGEN FROM THE AIR.

"WE'VE COME A LONG WAY SINCE THE WRIGHT BROTHERS AND--WITH JET--WE'RE GOING A LOT FURTHER."



"YES, JOHNNY, WE'RE RIGHT ON THE THRESHOLD OF A WHOLE NEW AGE OF FLIGHT..."

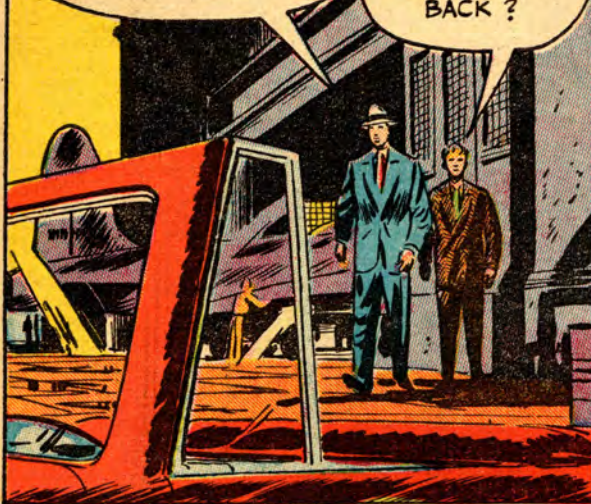


"BEHIND THESE DOORS, RESEARCH ENGINEERS ARE EXPERIMENTING WITH THE PLANES OF TOMORROW."



AND WHILE WE'RE TALKING ABOUT JET POWER, JOHNNY, REMEMBER- THE SKY'S NOT THE LIMIT. IT HAS A BIG FUTURE ON THE LAND AND SEA AS WELL.

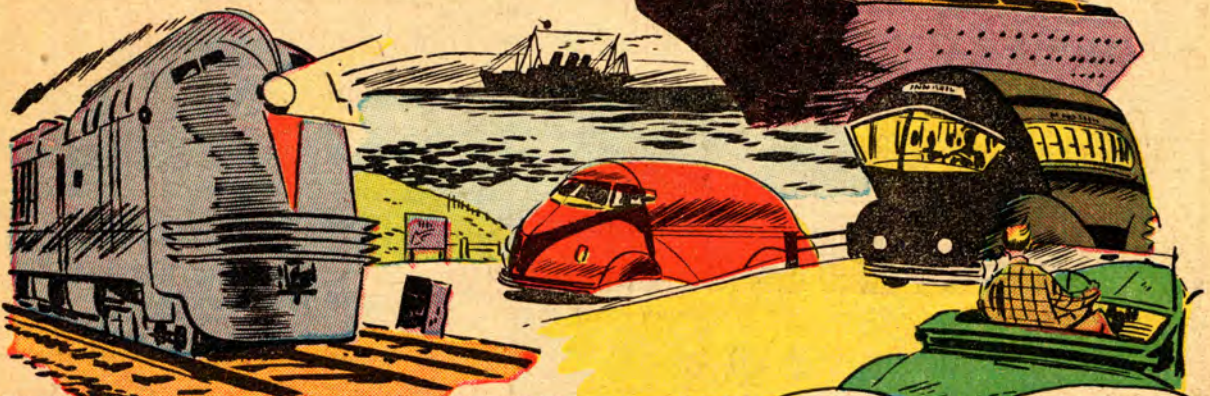
YOU MEAN WE'LL HAVE THINGS LIKE NEWTON'S "HORSELESS CARRIAGE" WITH JET SHOOTING OUT THE BACK?



NOT AT ALL, JOHNNY. WHEN JET POWER COMES DOWN TO EARTH, INSTEAD OF IT SHOOTING OUT THE BACK TO GIVE REACTIVE THRUST, WE CAN USE JUST ABOUT ALL THAT POWER TO TURN THE SHAFT IN A BIG "GAS TURBINE."



JUST IMAGINE, JOHNNY... TRAINS, SHIPS, TRUCKS, BUSES- ALL STREAM-LINED AND GAS-TURBINE POWERED...



WE'VE HAD STEAM-TURBINES FOR YEARS, JOHNNY, BUT THESE NEW GAS-TURBINES, TURNED DIRECTLY BY THE BURNING, EXPANDING GAS, OPEN A WHOLE NEW WORLD OF POWER. TURBO-JET PLANES ARE JUST THE FIRST APPLICATION.

WOW! I HOPE I'LL SEE THAT "NEW WORLD OF POWER"!

YOU WILL, JOHNNY... YOU WILL!



GENERAL  ELECTRIC
Schenectady, New York