

Dr. Struve. "Our methods and results are comparable and the Russians know this to be the fact."

Ideology Violates Principles

Reported attacks by the Soviets on Western astronomy are "tragically clear evidence that the policy of dictation of scientific 'principles' upon ideological and political grounds has been extended into the field of astronomy," a distinguished American astronomer declared.

AERONAUTICS

Better Jet Fuels Ahead

Fuels that will ignite at extremely low temperatures and which will not blow out in speeding ram-jets are being developed for rocket and jet engines.

➤ **BETTER** fuels for rocket and jet engines are promised for the near future as a result of research at the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics, Cleveland, Ohio. Equally important are engines under development capable of delivering the extremely large powers required for supersonic speeds.

All sorts of fuels and fuel combinations are being tried. Some have been found that experimentally give far better results than those now in general use. One studied is 2.5 times as powerful. Particularly important is the research work to develop better jet engines able to withstand the very high temperatures at which they operate, and to construct them of materials available in the United States, or at least in the Western Hemisphere. America, in national emergencies, needs independence from imports.

With the increasing use of rockets and ram-jet engines to give combat planes greatly increased power for short periods in emergencies, fuels that will ignite at the extremely low temperatures encountered at high altitudes are essential. Also essential are fuels whose flames will not blow out in the speeding ram-jet.

Rocket fuels, which at low altitudes and moderate temperatures ignite spontaneously and rapidly upon contact, may refuse to ignite at all at high altitudes, or they may ignite in explosive fashion destroying the rocket engine. Two solutions are being worked out at the Lewis Laboratory. One is to keep the engines and the fuels sufficiently warm to insure prompt and safe starting. The other is the use of added substances to the fuel to shorten the ignition lag.

The ram-jet engine, unlike the rocket, depends upon oxygen from the air for combustion. It scoops up the air as it flies at rapid speed through the atmosphere. It can operate only after it is up to a speed

Dr. Henry Norris Russell, famed astrophysicist of Princeton University, explained that "To call upon a colleague 'to correct his work along the lines of Soviet astronomical thought' is to violate the basic principles of scientific research.

"So long as the policy is continued, those who advocate it will be separated from all believers in freedom of investigation by an impassable barrier," Dr. Russell said.

Science News Letter, October 8, 1949

of some 300 miles an hour, a speed that it can acquire from its carrier plane if it is to be used to give spurts in emergencies, or a speed that it can acquire from carrier rockets if it is launched from the ground.

Because the air in a ram-jet passes through the combustion chamber at high speed, there is a tendency for the flame to blow out. Operating the engines at high altitudes with resulting low pressures also makes combustion difficult. Since 1945, it was revealed, the velocities at which good combustion efficiencies can be maintained have been increased three-fold, and further progress is expected. Similar progress has been made in increasing the altitude limits for satisfactory combustion, a result of intensive research on flame-holding devices, fuel-injection methods, and combustion chamber design.

Present jet engines of the type used in jet fighters and bombers burn a kerosene-type fuel. When a barrel of crude oil is refined, only 6% of the resulting products is kerosene. Present plans are to use in the future about 50% of the products refined from a barrel of crude, a mixture that would contain all the kerosene and gasoline and about one-fourth of the diesel and heating oils in the petroleum. As a result of NACA's work, new jet fuels have been specified meeting this availability maximum from crude oil and they are substantially equal or better than the kerosene-type fuels now used.

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On This Week's Cover

➤ **ROTOR** blades on a massive shaft are capable of handling 2,000,000 cubic feet of air per minute in the compressor of the world's largest faster-than-sound new wind tunnel at the NACA's Lewis Flight Propulsion Laboratory, Cleveland, Ohio. As shown on the cover, two halves of the stator housing have been opened.

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ENGINEERING

Coal-Fired Locomotives Predicted to Equal Diesels

➤ **COAL-FIRED** locomotives, which will equal or better the present diesel locomotives in operation, were predicted at the meeting of the American Society of Mechanical Engineers by John J. Kane of the Standard Stoker Company, Inc., at Erie, Pa.

Three research and development programs are now under way to bring about the coal-fired locomotive, he said. Only two basic locomotive designs are being considered, however. They are the gas turbine and the steam turbine, both combined with an electric drive.

In one research project, coal would be used to produce gas, which in turn is burned for the turbine energy supply. In another, the coal is pulverized and burned under pressure in new, radical combustors with direct air supply to furnish energy for the gas turbine. In the steam-turbine program, the use of water tube boilers, pressure furnace and complete combustion control are features involved in present designs.

Dwindling oil reserves are spurring the development of these coal-fired locomotives. The proposed steam turbo electric will use approximately 6,500 pounds of coal per hour at the maximum operating condition. Both gas turbine proposed units will demand between 4,000 and 4,500 pounds per hour at their highest operating rates.

These low fuel rates combined with coal conditioning, pulverization, evenness of supply and feed, and the pressurized system of combustion, set forth new and challenging demands on the coal handling system, he continued. He described coal screw conveyors and stokers developed for the purpose.

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AERONAUTICS

Supersonic Speed Claimed For British Jet Fighter

➤ A **BRITISH** jet fighter, still on the "secret list" but claimed to be capable of reaching a speed faster than sound, is no longer a secret as far as its general appearances are concerned. The public had an outside view of it at the recent Farnborough Airfield show of the Society of British Aircraft Constructors in London.

It is the bullet-shaped Vickers Supermarine 510. The Royal Air Force, it is revealed, will be equipped with this plane in the relatively near future. It is a descendant of the Attacker, a plane powered by a Rolls Royce Nene turbojet. The Nene develops 5,000 pounds of static thrust. Prominent features of the new Supermarine are its bullet shape and its swept-back wings.

Science News Letter, October 8, 1949