This photograph is taken from "With Gagarin to the Stars," due to be released on September 3. The rocket's exhaust gases cause a blurred picture, and the cost of black and white film is too high for the illustration, but it appears to show the flames from a close group of engines, with small side flames due to turbopump exhausts or verniers.

The Russian Space Rockets

Phases I and II

Phase I. Sputnik 1 was launched about six weeks after the Soviet Union announced successful tests of an ICBM in August 1957. Few would doubt that the ICBM was the launcher. The importance of Sputnik 1 was that it provided initial data on satellite behaviour, and especially on the size and power of the rocket. It proved the feasibility of spaceflight for a higher vertebrate—and so, by reasonable inference, for man. Clearly, the Russians planned for manned space flight in its earlier applications.

The length of the carrier rockets which orbited with Sputniks 1 and 3, and the length of Sputnik 2 in which the payload was united with the carrier rocket, were the subject of several speculative estimates. There seem to range from about 60ft for Sputnik 1's rocket to 80ft for the Sputnik 3's, and for the weight of Sputnik 3's rocket about 700ft in length. On the whole this is a consistent view of the final stage. We also know that Sputnik 3 was about 6ft across the base, and the Lunik final stage about 10ft in diameter.

First Conclusions

The provisional conclusion is that, while the Russians may have varied the tankage of the final stages of Sputniks 1, 2 and 3 by varying the length and diameter within certain limits, it is in all cases big enough to suggest the second stage of a two-stage rocket. By appeal to US information, a two-stage rocket built to a scale rather larger than Sputnik 2 should account for payloads of the order of those three Sputniks. Conventional propellants are assumed, with specific impulse in the Lox/RP-1 class. At launch the rocket might weigh 250,000 to 300,000lb, and develop a thrust of 400,000 to 500,000lb. These figures may be criticized as larger than necessary, at least in some respects. But we can be concerned only with orders of magnitude; and we must stress that the Sputnik launchings were not marginal achievements, but were comfortably within the capabilities of the rocket.

The Aftermath

The use of Sputnik 1 as a test rocket for Sputniks 1, 2 and 3, is now being questioned in the light of the subsequent progress. The purpose of the Sputnik 1 was to test the launching system, and with this purpose the Sputnik 1 mission was a success. But the subsequent course of events, including the orbiting of Sputnik 7 at 14,293ft, provides good reason for accepting that this is a powerful statement about the future of space exploration, making its debut with a payload which by no means represents its ultimate potential.

The least requirement of a launching vehicle specifically created for space exploration in conjunction with a spaceship-satellite would be to place the spaceship into close orbit. More importantly, the attitude of the space legislators, and of the space authorities, would have to be that manned space flight is the essential aim. In May this year the launching of Sputnik 2 began the new phase of rocket development. Phase II began with the launching of Sputnik 2 in October 1959. Phase II began with the launching of Sputnik 2, including in its 1,120lb payload the dog Laika, was a significant early pointer to the motives of the Russians. It proved the feasibility of spaceflight for a higher vertebrate—and so, by reasonable inference, for man. Clearly, the Russians planned for manned space flight in its earlier applications.

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