from 97 to 99 per cent. of nitrogen. When a 7- or 8-inch drill penetrates a high-pressure gas pocket the gas issues with a roar that can be heard a mile or more away and the well may continue to blow for a period lasting from a day to two weeks before the pressure is sufficiently reduced to permit resumption of drilling. The initial gas flow of large wells may reach 50,000,000 cubic feet per day from a reservoir having a possible total storage capacity of one half to one billion cubic feet of nitrogen gas. Most of these nitrogen gas pockets, however, are small and many are exhausted by open flow in a day or two.

The writer has observed that large accumulations of nitrogen gas may be confined in rocks which are related to basins of saline or brackish-water deposition. The rock minerals more commonly associated with nitrogen gas in the Permian Basin are halite, anhydrite and dolomite. Pockets of nitrogen gas are most common in the Salado formation of the Permian Basin. Though they are encountered less often in drilling through the Chalk Bluff formation, which underlies the Salado, the reservoirs are usually larger and their gas pressures higher because of their lower stratigraphic position and greater depth. In the Amarillo area nitrogen gas occurs still lower in the Permian section.

Nitrogen gas accumulations indigenous to sedimentary rocks are likely to be due either to a generation of the gas by chemical reactions occurring within the sediments or by the abstraction of oxygen from air entrapped with the sediments during deposition. The question of origin of the gas involves more discussion than can be offered here. Some oxygen is reported in most of the analyses of high nitrogen gases, which suggests that the nitrogen gas of the Permian Basin may be air from which most of the oxygen has been removed.

The critical evidence to support this hypothesis is not now available. Unfortunately, the routine cryogenic analysis does not determine and report the presence of argon or the other inert gases krypton, xenon and neon. Helium is reported for special investigations only. If any of these inert gases is present it appears in the report as nitrogen. Thus no natural nitrogen gas can be considered pure unless assurance is given that no appreciable quantities of the other inert gases are present with the nitrogen. Air contains about 1 per cent. of argon and if oxygen is removed argon will make about 1¼ per cent. of the remaining gases. If the gases of the Permian Basin that contain 98 per cent. of nitrogen are found upon analysis to have about 1 per cent. of argon, the evidence will be fairly conclusive that these gases were derived from the atmosphere.

Nitrogen gas formerly considered worthless is becoming useful in industry. The atmosphere, which is about 75 per cent. nitrogen, provides a universal, inexhaustible supply of this gas for the manufacture of acids and fertilizers. Nitrogen is now employed with argon in making electric lamps. Both gases are refined separately and then used for a specific purpose in lamp manufacture. Nitrogen from gas wells could be used as a substitute for carbon dioxide to smother enclosed fires which do not require a heavy gas, for quenching fires in the fuselages and motor nacelles of airplanes and for inflating rubber boats.

WALTER B. LANG

U. S. GEOLOGICAL SURVEY

FRANZ BOAS, PSYCHOLOGIST

IN their appreciations of Franz Boas, Benedict[1] and Lowie[2,3] have discussed his professional career, beginning with his early training in physics, geography and mathematics and culminating in his pioneer contributions to physical and cultural anthropology, linguistics and ethnology. Proper emphasis, however, has not been given to the fact that toward the end of his career, Boas became increasingly interested in *psychological* problems. In fact his chief interest seems to have shifted from the anthropological description and intercomparison of cultures *per se* to the psychological description of the specific stimulating conditions under which the individual's responses are acquired. The various investigations of motor behavior carried out by his research associates, covering such studies as those on posture, walking, speed of tapping and gesture, serve to illustrate this interest in experimental social psychology. That Boas maintained an interest in this field to the end is attested by his last letter to the writer, written four weeks before his death, in which he discussed certain methodological considerations in connection with a proposed study of bodily movements accompanying speech in the American Negro.

As more and more data were accumulated, Boas became increasingly certain of his position in explaining the individual's behavior in terms of his previous stimulation and resulting reactional biography rather than in terms of such typological constructs as "race." It is in this area of the social conditioning of behavior that one appreciates Boas's interest in psychological theory, and certainly here one must disagree with Lowie[2] and find Boas more than "a faithful, intelligent collector of raw detail." Experimental social psychology has lost one of its ablest students in his death.

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[1] R. Benedict, SCIENCE, 97: 2507, 60–62, 1943.
[2] R. H. Lowie, *Scientific Monthly*, February, 1943, pp. 183–184.
[3] R. H. Lowie, SCIENCE, 97: 2513, 202–203, 1943.