

*b. SALPETER—SODIUM NITRATE*

In 1926, Prunés observed 6 cases of skin cancer (2 basal cell carcinomas, 2 spinous cell carcinomas, 1 intermediary type, 1 unknown variety) among workers in the salpeter industry of northern Chile. During the years 1930 to 1935 Guzman had under his care six additional cases of cutaneous malignancy among individuals of this occupational group, all of whom had been engaged for many years in carrying bags filled with salpeter. In 1939 this investigator reported on a total of 17 cases of skin cancer in nitrate workers. These men had shown over an extended period of years multiple dyskeratotic lesions, having the form of plaques and nodules, located on their trunks and extremities (hands and feet). One or several of these callosities had exhibited, suddenly, after years of slow growth, highly malignant qualities.

The age range varied from 37 to 75 years (37, 53, 56, 58, 72, 78), and the exposure period was upward from 28 years to more than 50 years. Several of the men had followed this particular occupation since childhood. The dyskeratotic lesions preceded the malignant development by a varying number of years (25 years or less). The tumors were of verruco-papillomatous growth showing a tendency to break down and ulcerate. Histologically, they were squamous cell carcinomas, sometimes showing a high degree of anaplasia. Their location was on exposed parts or readily traumatized portions of the skin (forearm [2], heel, sole of foot, internal ankle, sternum, humero-scapular region). In one case, there were three tumors present.

Although these cases are the only ones observed among approximately 50,000 workers similarly exposed, Guzman believes that these cutaneous malignancies are the result of an occupational exposure to some chemical contained in salpeter (chemical irritation), probably accentuated by traumatic factors (noted in two of the six tumors). His attempts to reproduce these conditions in rabbits by the repeated application of a 20 per cent solution of salpeter to the skin were unsuccessful.

The chemical analysis of crude salpeter, which is mined as a brown to grey material, colored by an admixture of iron oxide and bituminous substances, shows that it is composed of sodium nitrate, potassium nitrate, sodium sulfate, sodium chloride, double salts of sodium nitrate and sodium sulfate, magnesium sulfate, and in some regions also potassium chlorate and perchlorate, magnesium chloride and double salts of calcium iodate and calcium chromate. The purified salpeter is obtained by extraction and precipitation from a hot or cold solution, depending upon the method used.

The evidence so far available in support of an occupational genesis of these tumors is not substantial. None of the chemicals contained in salpeter are known to possess specific carcinogenic properties. A non-specific chronic irritation by chemicals, on the other hand, does not provide, as a rule, the proper carcinogenic stimulus. This fact is well established by numerous observations made with chemical chronic dermatosis. Without additional and detailed in-