

MEMORANDUM
GOVERNMENT OF CANADA



NOTE DE SERVICE
GOUVERNEMENT DU CANADA

FROM
DE

M69

M14.

TO
A

M67

SUBJECT
SUJET

OUR FILE - N/RÉFÉRENCE	
C-15	
YOUR FILE - V/RÉFÉRENCE	
DATE	
May 13, 1975.	
REFER REPLY TO ENVOYER LA RÉPONSE À	TEL. NO. TEL.

young & Rice: were unable to distinguish ~~with what~~ between internally & externally deposited arsenic in the hair and question the value of tests for arsenic in the hair.

1. References re normal levels of arsenic

- 1) Clinical Handbook on Economic Poisons, U.S. Department of Health, Education, and Welfare, Public Health Service.

Page 104, Wayland J. Hayes, Jr., M.D., Ph.D.

"Normal people may excrete arsenic in the urine at rates as high as 0.17 ppm (as As₂O₃). Blood levels as high as 1 ppm have been reported in normal people as a result of arsenic in ordinary food and water.

"Concentrations in other tissues may be as high as 7.6 ppm: the hair may have 10-15 ppm.

"Asymptomatic chemical workers may show arsenic at a concentration of 100 ppm in hair and 0.82 ppm in urine."

- 2) Harrison's Principles of Internal Medicine, Sixth Edition, Chapter 117 - 665

Normal Av. 0.05 mg As/100 mg hair (500 ppm)

Range 0.025-0.088

Poisoning indicative at

> 0.1 mg As/100 mg hair (1000 ppm)

(I think there is an error in this.)

3) Advances in Forensic and Clinical Toxicology, 1972

"Maximum upper limit of normal with a 99% confidence limit in persons non-exposed to arsenic is about 5 ppm" - "but in investigation of suspected arsenic poisoning a bulk value should not be measured."

4) Industrial Toxicology by Hamilton and Hardy, 3rd Edition, 1974

"Data from the literature summarize the "normal" levels of arsenic content as follows:

Urine	0.013	0.046 mg/L
Hair	0.5	2.1 ppm
Nails	0.52	5.6 ppm

5) Toxicity of Industrial Metals by Ethel Browning, Chapter 4, page 36

Quotes a study by Hill and Fanning (1948) where the controls are supposedly non-exposed persons, measured up to 13 ppm arsenic in hair.

2. Medical examinations and symptomology re arsenic

1) Symptomology

Arsenic - Arsenic may cause either local or systemic manifestations. The local ones consist of cutaneous manifestations of various types, such as dermatitis, eczema, ulcers, keratosis, scleroderma and bronzing. Frequently, the eyelids and mucous membranes may be affected. If not properly treated, the lesions ~~may-be-affected~~ may undergo carcinomatous degeneration. Frequently, arsenic which is absorbed into the body is excreted by the sweat glands, so that lesions of the skin develop in moist areas, such as the scrotum or axilla, as well as on exposed surfaces. Dryness of the mouth and throat and hoarseness may result. Systemically, the metal causes trophic changes in the hair and nails (because of its affinity for sulphur), neuralgia and multiple neuritis, with slight motor paralysis, gastric symptoms and anemia. Arsine or hydrogen arsine, which is a gas often accidentally liberated by the contact of arsenic with an acid, has a rapid and violent hemolytic effect and may cause severe anemia with jaundice and hemoglobinuria. Both acute and chronic cases of exposure can usually be confirmed by the presence of arsenic in the urine and delayed chronic cases by analysis of the hair and nails.

From the Journal of American Medical Association, Vol. 139, No. 13, March 26, 1949.

2) Medical examinations recommended by NIOSH include the following:

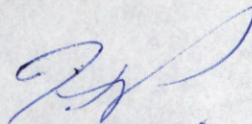
A medical and work history;

A 14 x 17 posterior-anterior chest X-ray, giving particular attention to parenchymal and hilar changes;

A complete blood count, to include differential, palpation of the superficial lymph nodes for indication of neoplastic changes;

Careful examination of the skin for persons of hyper pigmentation, keratoses, or other skin lesions;

Frequency of examinations would depend upon degree and type of exposure.

A handwritten signature in blue ink, appearing to read 'T. H. Patterson', is written above the printed name.

T. H. Patterson, M.D.