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Trace elements other than^⑨ fluorine²⁶ are also under study for caries prevention as is the use of the laser²⁷ beam²⁸.

The role of dental plaque²⁹ in the etiology of both dental caries and periodontal³⁰ disease has been recognized for many decades. However, only^⑩ recently have intensive laboratory and clinical studies of plaque prevention or control been in progress, especially as it relates to periodontal disease.

Word List

1. initiation [iniʃi'eɪʃən] *n.* 开始
2. benefit ['benɪfɪt] *n.* 好处, 利益
3. fluoridation [flu(:)əri'deɪʃən] *n.* 加氟作用, 氟化反应
4. occlusal [ɒ'klu:zəl] *a.* (牙)咬合的
5. permanent ['pɜ:mənənt] *a.* 永久的
6. deciduous [di'sɪdʒuəs] *a.* 非永久的, 脱落的
~ teeth 乳牙
7. preferential [prəfə'renʃəl] *a.* 优先的
8. pit [pɪt] *n.* 点隙; 小洞; 坑
9. fissure ['fɪʃə] *n.* 裂隙, 裂缝; 裂伤
10. etiology [i:'ti:ɒlədʒi] *n.* 病原学, 病因学
11. topically ['tɒpɪkəli] *ad.* 局部
12. sealant ['si:lənt] *n.* 封闭层, 密封剂
13. marginal ['mɑ:dʒɪnəl] *a.* 边缘的
14. leakage ['li:kɪdʒ] *n.* 漏, 渗漏
15. debris ['debri:] (复 debris ['debr-i:z]) *n.* 碎片, 碎屑
16. degradation [degrə'deɪʃən] *n.* 降级; 减低
17. decalcification [di:kælsɪfi'keɪʃən] *n.* 脱钙作用, 去钙法
18. warrant ['wɒrənt] *v.* 使有理由; 保证
19. promising ['prɒmɪʃɪŋ] *a.* 有希望的; 有前途的
20. provisional [prə'vɪʒənəl] *a.* 临时的, 暂时的
21. approval [ə'pru:vəl] *n.* 批准; 赞成
22. commercial [kə'mɜ:ʃəl] *a.* 商业的
23. dentistry ['dentɪstri] *n.* 牙科学; 牙科
24. assessment [ə'sesmənt] *n.* 估价; 评价
25. bibliography [bibli'ɒgrəfi] *n.* 书目提要; 文献目录; 目录学
26. fluorine ['flu(:)əri:n] *n.* 氟
27. laser ['leɪzə] *n.* 莱塞, 激光
28. beam [bi:m] *n.* 射线, 光束
29. plaque [plɑ:k] *n.* 斑; 血小板
30. periodontal [periou'dɒntl] *a.* 牙周的

Notes

1. if fully utilized 是一省略了句子成分的条件状语从句。写完全应为 if it is fully utilized 在这种句型中 it is 往往都被省略。
If necessary, I will go.
如果必要的话, 我愿去。
2. even if we could... 是让步状语从句。这类让步状语从句通常用虚拟语气。
3. to be met 是动词不定式作定语, 说明 problem。

The dilution²³ must have been enormous in many of the cases recorded i. e., there must have been very few typhoid organisms in a tumblerful²⁴ of water.

Many large epidemics have been traced to individual instances of pollution. The typhoid epidemics at Plymouth²⁵, and Reading²⁶, involving 3,929 cases with 361 deaths, were each caused by the careless treatment of the discharges of one individual patient.

The great waterborne epidemics of the past have nearly always been caused by polluted river or lake waters and not by ground waters. Ground water, however, has been responsible for a large number of small outbreaks of typhoid fever, especially in limestone²⁷ districts, as at Lausen²⁸, Switzerland, and Paris²⁹, France³⁰. Usually, when a well becomes badly infected it is from a nearby privy³¹ or sewer³², as in the instance of the Broad Street cholera epidemic in London, and the epidemic of typhoid fever at Santa Ana, Calif. In recent times, however, epidemics of waterborne disease have frequently been attributed to pollution of wells. Of 228 such outbreaks in the United States from 1946 to 1960 which were classified as to cause, 34 percent were due to untreated underground water supplies. A more recent example is the epidemic of over 16,000 cases of salmonellosis³³ in Riverside³⁴, a community served by water from deep wells.

Word List

- | | |
|---|--|
| 1. contract [kən'trækt] <i>v.</i> 得(病); 收缩 | 14. stringent ['strindʒənt] <i>a.</i> 严格的 |
| 2. tropical ['trɒpɪkəl] <i>a.</i> 热带的 | 15. Zermatt ['zæ:mæt] <i>n.</i> 策尔马特 (瑞士) |
| 3. bather ['beɪðə] <i>n.</i> 洗澡者; 游泳者 | 16. Switzerland ['swɪtsələnd] <i>n.</i> 瑞士 |
| 4. trend [trend] <i>n.</i> 倾向 | 17. victim ['vɪktɪm] <i>n.</i> 受害者; 牺牲者 |
| 5. tragedy ['trædʒɪdi] <i>n.</i> 悲剧; 灾难 | 18. incriminate [ɪn'krɪmɪneɪt] <i>v.</i> 连累; 显示...有罪 |
| 6. overshadow [oʊvə'shædɒu] <i>v.</i> 对...投上阴影; 使暗淡 | 19. glacial ['gleɪsjəl] <i>a.</i> 冰的 |
| 7. community [kə'mju:nɪti] <i>n.</i> 社会; 团体 | 20. defective [dɪ'fektɪv] <i>a.</i> 不完全的; 有缺点的 |
| 8. epidemiologic [epɪdɪ'mɪə'lɒdʒɪk] <i>a.</i> 流行病的 | 21. Pittsburgh ['pɪtsbə:g] <i>n.</i> 匹兹堡 (美国) |
| 9. negligence ['neglɪdʒəns] <i>n.</i> 疏忽, 玩忽 | 22. infrequent [ɪn'fri:kwənt] <i>a.</i> 很少发生的; 稀罕的 |
| 10. drastic ['dræstɪk] <i>a.</i> 激烈的, 猛烈的 | 23. dilution [daɪ'lju:ʃən] <i>n.</i> 稀释(物) |
| 11. cope [koup] <i>v.</i> 竞争; 对付 | 24. tumblerful ['tʌmbləfʊl] <i>n.</i> 满杯 |
| 12. enteric [en'terɪk] <i>a.</i> 肠的 | 25. Plymouth ['plɪməθ] <i>n.</i> 普利茅斯 (英国) |
| 13. traceable ['treɪsəbəl] <i>a.</i> 可归因的; 可追踪的 | 26. Reading ['rediŋ] <i>n.</i> 雷丁(英、美) |
| | 27. limestone ['laɪmstəʊn] <i>n.</i> 石灰石 |

- | | |
|--------------------------------|---|
| 28. Lausen [lou'zæn] n. 洛桑(瑞士) | 33. salmonellosis [sælmone'lousis] n. 沙门氏菌病 |
| 29. Paris ['pæris] n. 巴黎 | |
| 30. France [fra:ns] n. 法国、法兰西 | 34. Riverside ['rivəsaid] n. 里弗塞德(美国) |
| 31. privy ['prɪvi] n. 厕所 | |
| 32. sewer ['sjʊə] n. 阴沟, 下水道 | |

Notes

1. contracted 是过去分词, 作定语, 说明 diseases.
2. drinking 是动名词, 作介词 by 的宾语.
3. infected 是过去分词, 作定语, 说明 water.
4. contrary to 和...相反
The result is *contrary to* expectation.
结果与预料恰好相反.
5. via = through 通过
6. for a time 一度
7. to be traced to 追溯
The friendly intercourse between our two countries can be traced to the Ming Dynasty.
我们两国之间的友好往来可以追溯到明代.
8. developed 是过去分词作定语, 说明 areas.
9. in which...是关系代词引导的定语从句, 说明前面的 areas. 在这里 in which = where.
10. of which 是关系代词引导的定语从句, 这里 which 是指前面的 470 epidemics.
可译为: 在470 流行病例中, 33 例发生在五万以上人口的城市中.
11. that 是连词, 引导同位语从句. 与 evidence 同位.
12. that 是连词, 引导主语从句, 前面的 It 是形式主语.
13. that 是关系代词, 引导定语从句 that have been investigated, 说明 outbreaks.
14. fall of the year = autumn 秋天, 秋季

4. 水污染引起的特殊疾病(一)

由于饮用污染水而引起的人类主要疾病有伤寒、霍乱、细菌性及阿米巴痢疾。血吸虫病发生在某些热带地区；在美国的中西部则以缓和的方式侵袭游泳的人。与其他疾病相反，传染性肝炎有增加的趋势，虽然这可能仅仅反映是由于诊断水平的提高。在世界上这类疾病的介水流行常有发生。应该记住地方病和散发病例也可能由水引起。与水有关的爆发流行在过去一个时期内被过分夸张。它们掩盖了很少惹人注意但暗中为害的或许更常见的其他传播途径。除介水传染外，对其他传播方式引起的这些疾病的定量估计只是在近年来才开始。由于这些传染已从大多数公共供水系统中根除，故现在爆发流行常被追溯到其他的传播方式。当然这一观点仅适用于保存有充分流行病学资料的发达地区。关于有这些疾病地方性流行的不发达地区则了解很少。

然而，介水传染病的爆发流行仍然不时发生。通常是由于意外疏忽或情况骤变而又无法控制的结果。在 Wolman 和 Gorman 的报导中，列举了 1920~1936 年期间在美国和加拿大爆发的介水传染 470 起，其中 33 起是在人口超过 50,000 的城市中发生。1938~1945 年期间报导了介水传染共 327 起。其中 100 起是集中供水，3 起发生在较大城市。这就说明在较大的城市中如无严格的经常性的控制措施，通过水爆发肠道病是可能的。最近如 1963 年的一个月期间，在瑞士策尔马特，发生 437 例伤寒病的爆发流行；其中 260 例曾去该疗养地，有许多人在离开瑞士后病倒。致病的水源是取自冰河的集中供水，有证据表明其氯化消毒是不完全的。

值得注意的是，几乎所有已调查的较大的介水传染病的爆发，都具有传染物迅速从已病人传递到受害者的特点。匹兹堡伤寒委员会证实大多数伤寒病是由于附近河水而非远处河水的污染所致。伤寒、痢疾和霍乱菌在自然条件下并不在水中繁殖。几乎所有大规模伤寒的介水流行发生在一年中水温寒冷的春天、冬天或秋天。夏季情况似乎有利于伤寒菌的繁殖，但伤寒介水流行相对地却很少发生。被记载的许多情况中想必是水已经高度稀释，也就是说在一满杯水中伤寒菌已十分稀少。

很多大的流行已追溯到个人污染的情况。在普利茅斯和雷丁伤寒流行时，患者达 3,929 人，死亡 361 人，每一次流行都是由于个别病人的排泄物处理不当而引起。

以往大的介水流行几乎经常是由河、湖水的污染所致，而不是由于地下水引起的。然而，地下水对大量小型的伤寒爆发有关，特别在石灰石地区，如瑞士的洛桑和法国的巴黎。在井附近的厕所和下水道常可严重污染井水而造成流行，如在伦敦布劳德街霍乱流行和加利福尼亚州的 Santa Ana 的伤寒流行就是实例。在近代介水传染爆发流行通常归咎于井的污染，1946~1960 年在美国的 228 起爆发流行，就其原因分类，34%是因供给未处理的地下水所致。比较近的例子是在加利福尼亚里弗塞德有 16,000 多病人的沙门氏菌病流行，该地集中给水来自深井。

5. Special Diseases Caused by Water Pollution (II)

Public water supplies become contaminated in various ways. The use of a raw water into which^① is continually discharged the sewage of other towns has occurred at some cities. A city's residents¹ may drink the water of a lake which has become the city's own cesspool², as once did Chicago, etc. The pollution may come from the wastes of individual houses, or from institutions or factories; from privies situated directly over the stream or on its banks; or it may come directly after the offending matter has been deposited on the surface of the ground, later gaining access³ to the water course by the washing of rain or seepage⁴ through ground seams⁵. In some instances epidemics originate through carelessness in a town that has been supplied with a pure or purified water. Thus a water pipe⁶ laid through a polluted

pond⁷ or stream⁸ may become sufficiently disjointed to permit admission of the infected water. There is a record of numerous epidemics due to mixing in cities having dual⁸ water supplies. Epidemics have originated as a result of the unusual drain upon the water supply at times of fire, or through failure of valves to operate, when the ordinary water supply was judged to be insufficient and no public warning was given of the substitution; when a valve in a forgotten cross connection was unintentionally opened; or when polluted water was furnished temporarily while the filter plant was undergoing repair. Various public wells have become infected through ground seams and have thus caused epidemics of typhoid fever. In recent years outbreaks have resulted from the failure of chlorination⁹ plants or of other processes used to purify a polluted supply. Camping¹⁰ parties, construction gangs, fishermen, and boating parties have also contributed to the pollution of water supplies and thus indirectly to the literature of enteric disease.

Although the probability of the recrudescence¹¹ of cholera in the United States and the other developed countries of the West is low, endemic areas still expose a large part of the world's population, primarily in Asian¹² countries. Modern means of travel permit an even more rapid spread of the infection than in the past. A seventh pandemic of this disease has now been active in these countries from 1964 to 1973, affecting an estimated reported and nonreported 400,000 cases. At least one important route of transmission is via water used for drinking and household use.

Similarly, amebiasis¹³ is presumed¹⁴ to affect some 10 percent of the world's population. A WHO³ Expert Committee concluded recently that in all reported outbreaks of amebiasis, sewage-contaminated water supplies have been the major identified source of infection. Prevention lies primarily in the provision of completely protected piped water supply.

Attention has recently been concentrated on efforts to determine the significance of viruses in waterborne outbreaks. Clarke and Chang, in a survey, list 17 outbreak of infectious hepatitis which, on epidemiologic grounds, are established or strongly suspected to be waterborne. This includes six outbreaks in the United States, in each case involving small supplies, mostly private. One of these provides direct evidence; proof of the presence of the virus in the water through experiments on human volunteers. Unique¹⁵ in itself is the massive outbreak at New Delhi¹⁶, India¹⁷, in 1955~1956, which produced 30,000 to 50,000 cases. Here the raw river water taken into the filtration¹⁸ plant was rather suddenly polluted with large volumes of sewage from a drain into which raw sewage was discharged, and whose flow ordinarily moved downstream below the plant. The practice of adding chlorine and ammonia¹⁹ was another factor resulting in destruction of bacteria but not viruses. A contributing cause was the almost complete breakdown in administrative²⁰

as possible environmental factors contributing to the increase in the incidence of lung cancer. Those who believe that^③ air pollution may be one of the factors responsible for the recent increase in bronchogenic⁴ carcinoma⁵ cite the facts that^④ mortality from lung cancer is greater in urban than in rural areas, even among non-smokers; that^⑤ the lung cancer mortality in some areas of Great Britain is strongly correlated with smoke density⁶; and that^⑥ some aromatic⁷ and even nonaromatic compounds present in urban air and in the exhaust from automobiles produce cancer on the skin in mice when tested in relatively high concentrations^⑦. The concentration of these chemicals in the air, however, is very low.

Benzopyrene⁸ has been considered the most likely carcinogen⁹, although undoubtedly other chemicals in the air also are carcinogens or capable of acting synergistically¹⁰ with benzopyrene. This hydrocarbon¹¹ has produced bronchogenic carcinoma in experimental animals but only when associated with irritant gases or particulates and only in concentrations enormously¹² greater than exist in the ambient¹³ air (e. g., 10,000 μ g/cubic meter, as contrasted with urban air concentration of 0.003 μ g/cubic meter).

Another type of evidence cited is that persons who migrate¹⁴ from areas with a high lung cancer rate to one with a low rate maintain a higher rate of cancer than the native population, indicating a residual¹⁵ effect of their former exposure. Lastly¹⁶, it is claimed that lung cancer rates correlate with the solid fuel consumption and concentration of benzopyrene in the air.

On the other hand, considerable evidence exists to question the premise¹⁷ that^⑧ air pollution is a factor in lung cancer. The urban-rural difference in the lung cancer rate in females is much less than in males; moreover, high lung cancer rates occur in areas where^⑨ the concentration of pollutants including benzopyrene is low.

Some studies show that the lung cancer rate is not highly correlated with fuel consumption per acre¹⁸. The concentration of benzopyrene in the environment has been declining since 1940, whereas^⑩ the rate of lung cancer has been increasing. Benzopyrene exists in the air in very low concentration; in 1966 the average¹⁹ concentration in the United States was 0.003 μ g/cubic meter for ambient urban air and 0.0003 μ g/cubic meter for nonurban areas. In a study of pitch²⁰ roofing²¹ operations in which the workmen were exposed to high concentration of benzopyrene, the lung cancer rate was not significantly higher than in the normal population. No significant relation between the level of air pollution and mortality from lung cancer was found in several epidemiologic studies recently conducted in the United States. No association was found between degree of sulfation and cancer mortality in another study of men over 50 years of age. In the British study of postmen²², lung cancer was not correlated with air pollution. In residential²³ areas of certain districts in Great Britain the lung cancer mortality was not significantly associated with the smoke or

3. that 引导的从句是动词 believe 的宾语从句。
4. that 引导的从句是 facts 的第一个同位语从句。
5. that 引导的从句是 facts 的第二个同位语从句。
6. that 引导的从句是 facts 的第三个同位语从句。
7. when tested in relatively high concentrations = when they are tested in relatively high concentrations
8. that 引导的从句是 premise 的同位语从句。
9. where 引导的是定语从句，说明 areas。
10. whereas 是并列连词，作“而”解。

He is ill, *whereas* I am only a little tired.

他生病了，而我只不过稍觉疲倦罢了。

11. As 是关系代词，引导一个省略了成分的定语从句，它指的是后面的整个句子。

As (is) announced in the papers, our country has launched another man-made earth satellite.

报上宣布，我国又发射了一颗人造地球卫星。

7. 肺 癌

近年来由于肺癌死亡率的迅速增长，注意力已不仅集中在抽烟的作用上（现已有大量文献证明其为主要的病因），而且亦把注意力集中在大气污染有可能产生疾病的作用上。非特异性的尘土，刺激性气体，来自柏油路面的扬尘，汽车的排气，燃煤和燃油引起的煤烟和油烟，工业生产所产生的各种废物和在空气中出现的一些特异的有机化合物等这样一些物质，是可能导致肺癌发病率增高的环境因素。那些认为近来支气管癌的增高是由于空气污染所引起的人，引证了这样一些事实：肺癌的死亡率城市高于农村，甚至在不抽烟的人中亦是这样；英国一些地区肺癌死亡率和烟雾浓度密切相关；存在于城市空气中和汽车废气中的一些芳香族的、甚至非芳香族的化合物，对小白鼠用相对高的浓度作试验时可引起皮肤癌。可是空气中这些化合物的浓度是很低的。

苯并芘已被认为是最可能的致癌物，虽然空气中其它一些化学物质亦是致癌物或具有与苯并芘起协同作用的能力。苯并芘只有在与刺激性气体或灰尘相结合，并且浓度大大地高于周围空气中浓度时（例如苯并芘浓度 $10,000\mu\text{g}/\text{M}^3$ ，与之相比，城市空气中浓度是 $0.003\mu\text{g}/\text{M}^3$ ），才在实验动物中产生支气管癌。

引用的另一种证据，是那些从高肺癌率地区迁移到低肺癌率地区的人，比本地居民有较高的肺癌率，这显示了他们以前接触的残留作用。最后，认为肺癌率与固体燃料消耗及空气中苯并芘浓度有关。

另一方面，有大量证据怀疑空气污染为肺癌的因素。女性肺癌率的城乡差异比男性低得多，并且在包括苯并芘在内的污染物浓度低的那些地区，出现了较高的肺癌率。

一些研究证明，肺癌率与每英亩面积上燃料消耗的关系不大。从 1940 年以来，环境中苯并芘浓度一直在降低，而肺癌率一直在增高。空气中苯并芘浓度极低，美国 1966 年环绕都市空气中的平均浓度是 $0.003\mu\text{g}/\text{M}^3$ ，而非都市区是 $0.0003\mu\text{g}/\text{M}^3$ 。对从事盖涂沥青屋顶工作而接触高浓度苯并芘的工人的调查研究，肺癌率与正常人相比无显著增高。

equipped with catalysts²⁰ which require lead-free gasoline will come into² use.

From a mass balance²¹ point of view, the transport²² and distribution of lead from stationary or mobile sources is mainly via air. Although large amounts are probably also discharged into soil and water, lead tends to localize near the points of such discharge. Lead that is discharged into the air over areas of high traffic density²³ falls out mainly within the immediate metropolitan²⁴ zone²⁵. The fraction that remains airborne is widely dispersed²⁶. Residence²⁷ time for these small particles is of the order of days and is influenced²⁸ by rainfall²⁹. In spite of widespread dispersion³⁰, with consequent³¹ dilution³², there is evidence of lead accumulation³³ at points extremely remote from³ human activity, e. g. in glacial³⁴ strata³⁵ in Greenland³⁶.

The biota³⁷ acquires lead both by surface deposition³⁸ and by secondary transfer from soil to plants and from plants to animals. However, the impact³⁹ of man-made lead pollution on the lead content of plants and animals is not perceptible⁴⁰ except in localized areas of intense air pollution, e. g. around smelters⁴¹ and in the immediate vicinity⁴² of roads with heavy traffic⁴.

The concentration of lead in air varies from 2-4 $\mu\text{g}/\text{m}^3$ in large cities with dense automobile traffic to less than 0.2 $\mu\text{g}/\text{m}^3$ in most suburban⁴³ areas and still less in rural areas. The concentration of lead in drinking water is generally less than 10 $\mu\text{g}/\text{litre}$, but in some areas where the water is soft (low in calcium and magnesium⁴⁴) and where, at the same time, lead pipes and lead-lined water storage tanks⁵ are used, the concentration may reach 2000-3000 $\mu\text{g}/\text{litre}$. At this concentration (and even at concentrations of several hundred $\mu\text{g}/\text{litre}$) a perceptible rise in the body burden of lead occurs, which is reflected⁴⁵ in elevated⁴⁶ values of lead in the blood (Pb-B).

The contribution of food to man's exposure to lead is highly variable. No specific category⁴⁷ of food has been identified as being especially high in lead content other than wine⁴⁸ and foods that are stored in lead-soldered⁴⁹ cans⁵⁰ or lead-glazed⁵¹ pottery⁵². Processed milk contains considerably more lead than fresh cow's milk which has a similar⁵³ concentration to human milk. The reported lead concentrations range from less than 5 $\mu\text{g}/\text{litre}$ to 12 $\mu\text{g}/\text{litre}$. If this information is correct, milk could be a significant⁵⁴ source of lead for infants⁵⁵.

In certain countries, gross overexposure of some infants and young children has been recorded. The major sources are lead-based paint in old houses and in the soil surrounding these homes, and the soil surrounding lead smelters. Lead in street dust due to atmospheric fallout⁵⁶, and miscellaneous⁵⁷ lead-containing objects chewed or eaten by children are other possible sources of exposure, but their relative importance is not clear.

The highest exposure occurs in workers who come into contact with lead during

11. sinter ['sintə] *v.* 熔结, 烧结
12. dross [dros] *n.* 浮渣
13. reverberation [rivə:bə'reiʃən] *n.* 反焰
14. monitor ['mɒnitə] *n.* 监测器, 检验器
15. station ['steɪʃən] *n.* 岗位; 位置; 站
16. scrap [skræp] *n.* 碎片; 零屑; 废料
17. discard [dis'kɑ:d] *v.* 丢弃, 抛弃
18. cable ['keɪbl] *n.* 电缆
19. casing ['keɪsɪŋ] *n.* 套管; 罩
20. foundry ['faʊndri] *n.* 铸造; 翻砂
21. virtue ['vɜ:tju:] *n.* 善; 优点
22. spillage ['spɪlɪdʒ] *n.* 溢出; 溅出; 散落
23. floor [flɔ:] *n.* 地面; 地板
24. torch [tɔ:tʃ] *n.* 喷灯; 吹管; 割炬
25. prior ['praɪə] *ad.* 在前
26. assembly [ə'sembli] *n.* 装配
27. welder ['weldə] *n.* 焊工
28. weld [weld] *v.* 焊接; 锻接
29. zinc [zɪŋk] *n.* 锌
30. silicate ['sɪlɪkɪt] *n.* 硅酸盐
31. substantial [səb'stænʃəl] *a.* 大量的; 物质的
32. galvanize ['gælvənaɪz] *v.* 电镀
33. ventilation [ventɪ'leɪʃən] *n.* 通风; 通风设备
34. dismantle [dis'mæntl] *v.* 拆卸; 脱...衣服
35. intoxication [ɪntəksɪ'keɪʃən] *n.* 中毒
36. hygienic [haɪ'dʒɪ:nɪk] *a.* 卫生(学)的
37. marginal ['mɑ:dʒɪnəl] *a.* 边缘的; 限界的
38. prevail [pri'veɪl] *v.* 胜过; 普遍; 盛行
39. tetraethyllead ['tetrə'eθɪled] *n.* 四乙(基)铅
40. tetramethyllead ['tetrə'meθɪled] *n.* 四甲(基)铅
41. annual ['ænjuəl] *a.* 每年的, 年度的
42. inevitably [ɪn'evɪtəbli] *ad.* 必然; 不可避免地
43. petroleum [pi'trəʊljəm] *n.* 石油
44. refinery [ri'faɪnəri] *n.* 精炼厂, 提炼厂
45. blend [blend] (blended 或 blent [blent]) *v.* 混和, 把...混成一体
46. ethyl ['eθɪl, 'i:θaɪl] *n.* 乙基; 四乙铅
47. autoclave ['ɔ:təkleɪv] *n.* 压热器; 高压锅
48. hopper ['hɒpə] *n.* 加料斗, 漏斗
49. residual [ri'zɪdʒuəl] *a.* 剩余的; 残留的
50. sludge [slʌdʒ] *n.* 残渣
51. ship [ʃɪp] *v.* (用船)装运
52. drum [drʌm] *n.* 圆桶; 鼓; 鼓膜
53. tanker ['tæŋkə] *n.* 油槽(汽车)
54. lorry ['lɒri] *n.* 运货汽车, 卡车
55. reagent [ri(:)'eɪdʒənt] *n.* 试剂

Notes

1. by virtue of 由于, 因为

2. prior to 在前

It happened *prior to* my arrival.

这发生在我到达之前。

3. in the open 在露天

还不很清楚。很多学者曾经报告关于在试管中把铅加到血浆或生理盐水的红细胞悬浮液中的研究,但这些研究的正确性存在严重问题。例如,Clarkson 和 Kench (1958)发现在试管里加入的铅很易被 EDTA 所去除,而加铅以前的细胞内的残留铅则不能被去除。这提示了:(1) 结合的程度;(2) 结合在细胞内或细胞上的位置;或 (3) 铅结合的类型等有差异。最近的研究指出铅主要与人体的红细胞蛋白结合,更多的是对血红蛋白的结合而不是对基质。

在人体用一个稳定的铅的同位素示踪元素 (^{204}Pb),研究了有关血铅与摄入源和血铅与其他部位间的平衡率问题。报导的资料指出,每日口服固定量的 (^{204}Pb),大概在 110 天可达到示踪元素在血液中恒定的浓度。一旦从饮食中抽去示踪元素 ^{204}Pb ,则血液中 ^{204}Pb 浓度消失的半衰期约为 19 天。消失与蓄积动力学研究提示出相对活动的部位具有高度的交换率。Tola 等也提出当人新进入职业性铅环境时,血铅浓度很快上升到新的稳定水平。反映新环境达到新平衡状态的血铅浓度所需的时间约为 60 天。

身体铅的负荷从出生到老年是递增的。审查各个器官与系统的资料之后,很明显在体内有两个总的铅贮藏所。就总铅量来说,主要的一个是骨。此一贮藏所有明显的高度蓄积性。因而,在骨内铅的蓄积是在大半生时间里的,其他的器官和系统的蓄积很少,且在不同程度上,在成年人相当早就趋向稳定,反映了比骨有较大的周转率。

因为组成可交换的身体负荷的器官与系统具有较大的毒理学意义,所以,区别身体的总负荷与可交换的身体负荷是有充分理由的。应特别注意,全血中的铅是身体负荷中的可交换的一部分。在一般的成人中,无论是全血中或血清中的铅浓度都没有年龄区别。因而一般说来,血铅水平反映了软组织的铅浓度,随着接触水平变化而血铅浓度的长期改变,可能有其他可交换的贮藏所相应的长期变化。

乳牙的铅浓度受到了特别重视,因为它们从幼儿身上很容易获得,并且因为它们几乎象骨铅一样提供了一个长时期铅接触的记录。靠近牙髓的牙质在这方面是特别有用的,因为它是从长牙到脱牙期间形成的。曾有报告说,郊区儿童牙质的铅浓度比高铅接触地区的儿童要低得多。

头发铅用来作为接触指标的可能性曾引起一定的兴趣。遗憾的是迄今为止,如何根据头发的分析去介释接触的频率与程度,还没有可靠的知识。

动物实验对更精确地确定铅在各组织内的分布与从各组织清除的动力学性质是特别有用的。给大鼠一次剂量的铅之后,软组织内铅的浓度是相当高的,随后主要由于转移到骨内便很快下降。铅的分布特征在很大范围内不决定于铅剂量。从骨的清除速度远较其他组织为低。对大鼠的研究指出,通过自然排泄一次剂量铅从体内的清除率随着时间而变慢,反映了残留的体内铅负荷有进行性的减少。毫无疑问,这是由于铅逐渐更深入地进入骨母质,使它与其他部位的可交换性和它排出的有效性降低了。

在大鼠内关于铅的分配与滞留已观察到有明显的年龄差异。一次剂量的示踪元素 ^{203}Pb 从身体、血液及肾脏性的清除率在成年人比乳儿为快。在脑方面,乳儿的脑 ^{203}Pb 含量实际上有轻微的增加而在其他的软组织里是下降的。许多动物研究也证实了铅从胎盘转移到胎儿。

the most commonly reported symptoms. The course of the intoxication runs from 1 to 10 weeks. Although alkyllead compounds are notorious⁴⁴ for their high lethality⁴⁵, recovery is fairly complete among survivors. Convulsions and coma apparently occur only in the most severe cases. There is insufficient information to establish dose-effect and dose-response relationships.

2. Peripheral Nervous System

Inorganic lead has toxic effects on the peripheral nervous system. The older lead literature cites the frequent occurrence of lead palsy in occupational exposure to lead. The manifestations are mainly weakness of the extensor⁴⁶ muscles, particularly those used most heavily. While motor function is mainly affected, hyperaesthesia⁴⁷, analgesia, and anaesthesia of affected areas have also been reported.

Catton et al. (1970) found evidence of reduced nerve conduction velocity⁴⁸ in about one-third of a group of 19 occupationally-exposed men of whom only one showed any other overt⁴⁹ signs of lead toxicity.

The most prominent finding of Seppäläinen & Hernberg in lead workers (Pb-B levels 80–120 μ g/100ml) without any clinical neurological signs was reduced motor conduction velocity of the slower fibres of the ulnar⁵⁰ nerves; electromyographic⁵¹ changes included a diminished number of motor units on maximum contraction and fibrillations⁵². Similar although less pronounced⁵³ effects were reported by Seppäläinen et al. in 26 workers whose Pb-B levels had never exceeded 70 μ g/100ml (exposure time 13 months–17 years). Furthermore, in lead workers with Pb-B levels of 2–73 μ g/100ml, Araki & Honma reported statistically significant negative correlations between nerve conduction velocity and Pb-B, ALAD, and lead mobilization test values, respectively. More recently, Seppäläinen et al. reported a dose-response relationship between abnormally low conduction velocities, defined as values 2 standard deviations below the mean of an unexposed reference group, and the highest Pb-B recorded during employment (2–20 years). The results indicate that nerve conduction impairment is induced in some workers at Pb-B's exceeding 50 μ g/100ml.

Word List

- | | |
|---|---|
| 1. encephalopathy [ensefə'lopəθi] <i>n.</i>
脑病 | 6. delirium [di'liəriəm] (复 deliriums
或 deliria [di'liəriə]) <i>n.</i> 谵妄; 神
志昏迷; 说胡话 |
| 2. dullness ['dʌlnis] <i>n.</i> 迟钝; 呆笨 | 7. mania ['meinjə] <i>n.</i> 躁狂症; 疯狂 |
| 3. restlessness ['restlisnis] <i>n.</i> 烦躁 | 8. paralysis [pə'rælisiz] (复 paralyses
[pə'rælisi:z]) <i>n.</i> 麻痹; 瘫痪 |
| 4. tremor ['tremə] <i>n.</i> 震颤 | 9. coma ['koumə] <i>n.</i> 昏迷 |
| 5. hallucination [həlu:'si'neiʃən] <i>n.</i>
幻觉; 幻觉象 | |

10. convolution [kɒnvə'lu:ʃən] *n.* 回, 脑回
11. hemisphere ['hemisfiə] *n.* 半球
12. extravasation [ekstrəvə'seiʃən] *n.* 外渗; 溢血
13. patchy ['pætʃi] *a.* 斑状的; 补钉似的
14. neuronal ['njuərənəl] *a.* 神经细胞的; 神经原的
15. serous ['siərəs] *a.* 血清的; 浆液的
16. glial ['glaiəl] *a.* 神经胶质的
17. proliferation [prɒlifə'reiʃən] *n.* 增殖, 增生
18. demyelination [dimaiəlini'zeiʃən] *n.* 脱髓鞘(作用)
19. histological [histə'lɒdʒikəl] *a.* 组织学的
20. neurological [njuərə'lɒdʒikəl] *a.* 神经病学的
21. sequela [si'kwɪ:lə] (复 sequelae [si'kwɪ:li:]) *n.* 后遗症
22. episode ['epɪsɒd] *n.* 发作; 插曲
23. qualitatively ['kwɒlɪtətɪvli] *ad.* 定性; 性质上
24. traumatic [trɔ:'mætɪk] *a.* 损伤性的, 外伤性的
25. cortical ['kɔ:tɪkəl] *a.* 皮质的; 外皮的
26. atrophy ['ætɹəfi] *n.* 萎缩(症)
27. hydrocephalus ['haɪdrəu'sefələs] *n.* 脑积水, 水脑
28. seizure ['si:ʒə] *n.* (疾病的) 发作
29. idiocy ['ɪdiəsi] *n.* 白痴
30. subtle ['sʌtl] *a.* 难以捉摸的; 稀薄的
31. underestimate ['ʌndər'estimeɪt] *v.* 低估; 看轻
32. asymptomatic [æsɪmptə'mætɪk] *a.* 无征状的
33. ethnic ['eθnɪk] *a.* 种族的
34. neonatal ['ni(:)ou'neɪtl] *a.* 新生的
35. pica ['paɪkə] *n.* 异食癖
36. subnormal ['sʌb'nɔ:məl] *a.* 低于正常的
37. antedate ['æntɪ'deɪt] *v.* 先于, 前于, 使提前发生
38. aggravate ['ægrəveɪt] *v.* 加重(病情), 使更恶化
39. psychiatric [saɪki'ætrɪk] *a.* 精神病学
40. insomnia [ɪn'sɒmniə] *n.* 失眠(症)
41. delusion [di'lu:ʒən] *n.* 妄想; 错觉
42. mood ['mu:d] *n.* 情绪, 心情
43. swing [swɪŋ] *n.* 摇摆
44. notorious [nou'tɔ:riəs] *a.* 众所周知的; 臭名昭著的
45. lethality [li'θælɪti] *n.* 致死性
46. extensor [ɪks'tensə] *n.* 伸肌
47. hyperaesthesia [haɪpəris'θi:zjə] *n.* 感觉过敏
48. velocity [vi'lɒsɪti] *n.* 速度; 速率; 周转率
49. overt ['ouvə:t] *a.* 公开的; 明显的
50. ulnar ['ʌlnə] *a.* 尺骨的
51. electromyographic [i'lektrou'maɪəgræfɪk] *a.* 电动肌肉描记的
52. fibrillation [faɪbrɪ'leɪʃən] *n.* 纤维性颤动
53. pronounced [prə'naʊnst] *a.* 显著的; 明显的

Notes

1. that 引导同位语从句, 与前面的 doubt 是同位关系。

2. *those* 是代词, 代替前面的 *signs and symptoms*, 以避免重复。

3. *in view of...* 鉴于...; 考虑到; 由于

in view of these facts 考虑到(鉴于)这些事实

15. 铅对神经系统作用的临床和流行病学研究

一、中枢神经系统

无机铅化合物: 铅对神经系统的作用随着接触的持续时间和强度而改变。也应区分铅对中枢神经系统和周围神经系统的作用。此外要提出的问题是关于成人与婴幼儿神经系统敏感性之间的差异。毫无疑问, 铅对脑的影响见于童年时期铅中毒要比成人铅中毒多。但是, 也可能这些差异与确诊这些病例时接触强度有关, 而不是与什么遗传、敏感性的差异有关。

慢性铅接触时, 可产生所谓铅性脑病的明显毒性作用。成人铅性脑病有许多详细记载。主要特征是迟钝、不安定、兴奋、头痛、肌颤、幻觉、记忆力和注意力减退。这些体征和症状可发展成谵妄、狂躁、惊厥、麻痹和昏迷。婴、幼儿脑病的体征和症状, 与据报导发生于成人的症状和体征十分相似。

铅中毒致死病例时脑的损伤是大脑水肿和大脑血管变性。大脑半球的正常脑回常常消失。毛细血管的内皮细胞常肿胀。红细胞外渗及血管周围出血更常发生, 另外斑状神经元消失、浆液渗出、神经胶质细胞增生和偶见的脱髓鞘区等均是铅中毒的特征。但是, 并不是所有死于铅性脑病者都伴有中枢神经系统组织损伤。

在严重的和反复发作的铅性脑病情况下, 可发生神经系统后遗症。这种后遗症其性质与创伤性或感染性大脑损伤所发生的相同。幼儿发生持久性的后遗症似乎比成人更常见。患一次急性铅性脑病存活的儿童大约有 $\frac{1}{4}$ 有持久性的后遗症。这种情况至少在采用如Chisolm所述这类现代治疗方法之前确是如此。后遗症的发病率近年来实际上已有所减少, 但如果在铅性脑病发作后才开始治疗, 那么中枢神经系统后遗症仍然可能发生。最严重的后遗症是皮层萎缩、脑积水、癫痫发作和白痴。更常见的是, 其后遗症的性质更难于捉摸。学习能力可由于运动不协调, 感官知觉丧失或注意力不能集中而受损害。接触高浓度铅的儿童, 而无脑病史者, 也会发生这种精细的高级神经分析机能的障碍。

目前, 须主要关心的问题是高浓度铅接触的幼儿, 其血铅浓度为 $40\sim 80\mu\text{g}/100\text{ml}$, 可能有轻度的神经损伤, 而从未发生过铅性脑病典型的征候。血铅值在此范围内的儿童, 其神经状态的研究已有过报告。鉴于铅对脑可能有长期作用, 在评价时血铅值和神经状态之间的联系, 在损伤开始时可给人以铅接触是什么浓度的假象。检查时的接触浓度可能会低于发生毒性作用时的浓度, 所以血铅浓度与作用的联系可能会低估引起作用的剂量。

Kotok 确定血铅浓度高($58\sim 137\mu\text{g}/100\text{ml}$)而无症状的儿童组, 其发育缺陷与年龄、性别、种族、环境、出生时的条件和异食癖均相同, 但血铅浓度较低($20\sim 55\mu\text{g}/100\text{ml}$)的对照组相一致。(发育缺陷采用了Denver发育筛选试验, 作者的意见这种试验是较不敏感的发育测定方法。)这些缺陷可能与儿童们的环境不良有关, Klein等指出在许多研究中, 异食癖没有用作对照的变量。根据他的观点, 异食癖可能是行为缺陷综合征

的一部分。在这种情况下，这种儿童不管吞食含铅物品与否，总会有行为缺陷。有确证，在精神异常的儿童中，虽然他们的精神上的缺陷与过多的铅吸收无关，但异食癖和中度血铅升高发生率均高。在此研究中，估计有异食癖而精神异常的儿童中，有 67% 的血铅浓度为 39 到 88 $\mu\text{g}/100\text{ml}$ ，平均为 48 $\mu\text{g}/100\text{ml}$ 。相反，没有异食癖的精神异常组中，除一例外，血铅浓度均低于 36 $\mu\text{g}/100\text{ml}$ 。此研究不排除过度的铅接触能使原有的异常状态加重的可能性。

羟基铅化合物：羟基铅中毒性脑病与接触无机铅引起的中毒性脑病略有不同。已证明的成人中毒病例中，最常见的是精神方面的问题。幻觉、震颤、谵妄、失眠、妄想、头痛和剧烈的情绪激动是最常见的症状。中毒的病程为 1 至 10 周。虽然羟基铅化合物是众所周知的致死率高的毒物，但在存活者中恢复却是相当完全的。惊厥和昏迷显然只发生在最严重的病例中。确定剂量—效应与剂量—反应关系的知识还不够。

二、周围神经系统

无机铅对周围神经系统有毒性作用。老的文献引证了职业性接触铅经常发生铅麻痹。主要表现是伸肌无力，特别是使用最多的肌肉。虽然运动功能是主要受累的，但神经过敏、痛觉缺失和受影响区域麻痹也有报告。

Catton 等发现 19 个职业性接触铅的人中，大约 $\frac{1}{3}$ 有神经传导速度减慢的证据，其中仅有一人有一些铅中毒的其他明显征候。

Seppäläinen 和 Hernberg 在接触铅（血铅 80~120 $\mu\text{g}/100\text{ml}$ ）而没有任何临床神经征候的工人中，发现最突出的是尺神经慢纤维运动传导速度减慢；在最大收缩和纤维颤动时，肌电图有运动单位数减少的改变。Seppäläinen 等曾报告在 26 个血铅从未超过 70 $\mu\text{g}/100\text{ml}$ 的工人（接触时间 13 个月~17 年）有类似的但不甚显著的作用。而且 Araki 和 Honma 曾报告在血铅为 2~73 $\mu\text{g}/100\text{ml}$ 的铅工中，神经传导速度分别与血铅值、ALAD 和铅动用试验值之间，统计上有显著的负相关。最近，Seppäläinen 等报告了异常低的传导速度（低于未接触对照组平均值 2 个标准差以下）和工作时间内（2~20 年）记录的最高血铅值之间有剂量反应关系。这些结果表明在血铅值超过 50 $\mu\text{g}/100\text{ml}$ 时，可诱发一些工人神经传导损害。

16. Jonas Salk

“I cannot imagine a time when there will be no problems to solve.” These are the words^① of Dr. Jonas Salk, a scientist who developed the polio¹ vaccine that is today preventing the crippling² of millions of persons.

Salk was born in New York City in 1914. Unlike many famous men of science, he was not introduced to the world of science^② until he entered college. While in high school, he had not even studied science and had planned to follow a career³ in law. But during his first year in college, he took several science courses, “out of curiosity⁴,” as he put it. His interest was awakened⁵, and he soon proved to be a brilliant

science student. The fact that he had to earn⁶ much of the money for his education did not discourage him.

After completing college in 1934, Salk entered medical school. His ambition⁷ was to do medical research. To him science meant research. Even when his school advisers told him that there would be few financial⁸ rewards⁹ in research, he replied¹⁰: "There is more in life than money." He even interrupted¹¹ his medical training for a year to do research in chemistry. Finally, after becoming a doctor, he joined the staff of the School of Public Health at the University of Michigan¹². There he worked as a research associate¹³ in the study of influenza, looking for a possible vaccine against this disease.

At Michigan Salk spent five years. He learned more and more about the viruses that cause so much sickness in the world. Then in 1947 he went to the University of Pittsburgh¹⁴, where he began studies on the polio virus. This research was supported by money from the National Foundation for Infantile¹⁵ Paralysis¹⁶, founded by President Franklin D. Roosevelt[®], who was himself a polio victim.

The discovery that[®] polio virus could be grown in cultures in the laboratory had already been made by another group of researchers at Harvard¹⁷ University. This important step helped Salk in his research. By 1953 he had advanced far enough in his search for a polio vaccine to conduct a limited series of[®] tests on volunteer subjects in and near Pittsburgh. These tests revealed that the introduction of an inactive virus vaccine into the body helped raise the level of natural polio fighters in the blood stream and did not create harmful side-effects. From these early and limited tests grew mass field trials which took place before the start of the 1954 polio season. A year later in April 1955, Salk announced that the vaccine was a success. Science had gained another weapon in the universal¹⁸ struggle against disease.

Dr. Salk was the first to point out that the anti-polio vaccine was the result of long years of study by scientists in laboratories around the world. He particularly emphasized¹⁹ that all financial support for his work came directly through voluntary contributions of the American people. And he was the first to recognize that the effectiveness of the vaccine would never have been proved so swiftly²⁰ without the help of hundreds of public-health workers. Above all, he praised²¹ the "scientific spirit" of those people, particularly parents, who with remarkable faith²² committed their children to the possible risks of testing the vaccine.

In the years that have passed since the first trials of the vaccine, millions of people all over the world have been protected from the disease. Also many countries outside the U. S. now produce their own vaccine, and everywhere the results have been excellent²³. In the United States almost all Americans under forty years of age have received the vaccine. As a result, the number of cases of polio has declined steadily in each year that the vaccine has been available. In 1955, for example,

more than 30,000 cases were reported. By 1956 the figures²⁴ had declined to less than 7,000, and a year later just a few more than 2,000 cases were reported. In 1970 there were only thirty-three.

The success of the Salk polio vaccine proves that today's rapid progress in the health sciences often must involve thousands of people and millions of dollars²⁵. No longer^⑥ is scientific discovery a matter of a man working alone.

For Dr. Salk of course, polio vaccine was not the end of his labors. It was merely the start. He is now at work on intensive virus research, seeking the answers to other age-old problems of disease. He is aware that we still have a long way to go in improving human living conditions and in fighting sickness wherever it is found. For his own part in this struggle, Dr. Salk says: "A true artist could not complete a painting if he did not believe it was the best that he could do at the time. It is by the experience that comes with progress made in small steps that we contribute to the health and happiness of those who live with us and those who will follow us..."

Word List

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|---|--|
| 1. polio [ˈpouliou] <i>n.</i> 脊髓灰质炎, 小儿麻痹症 | 人; 同事 |
| 2. cripple [ˈkripl] <i>v.</i> 使跛; 使残废 | 14. Pittsburgh [ˈpitsbɜ:g] <i>n.</i> 匹兹堡 (美国城市) |
| 3. career [kəˈriə] <i>n.</i> 职业, 专业; 生涯 | 15. infantile [ˈɪnfəntaɪl] <i>a.</i> 婴儿的, 小儿的 |
| 4. curiosity [kjʊəriˈɒsiti] <i>n.</i> 好奇(心) | 16. paralysis [pəˈrælisɪs] (复 paralyse [pəˈrælisi:z]) <i>n.</i> 麻痹; 瘫痪 |
| 5. awaken [əˈweɪkən] <i>v.</i> 使觉醒, 唤醒 | 17. Harvard [ˈhɑ:vəd] <i>n.</i> 哈佛(大学) |
| 6. earn [ɜ:n] <i>v.</i> 赚得, 挣得; 赢得 | 18. universal [juːniˈvɜ:səl] <i>a.</i> 全世界的; 普遍的 |
| 7. ambition [æmˈbiʃən] <i>n.</i> 志向, 抱负; 野心 | 19. emphasize [ˈemfəsaɪz] <i>v.</i> 强调, 着重 |
| 8. financial [faɪˈnænʃəl] <i>a.</i> 财政的 | 20. swiftly [ˈswɪftli] <i>ad.</i> 快, 迅速 |
| 9. reward [riˈwɔ:d] <i>n.</i> 报酬; 报答 | 21. praise [preɪz] <i>v., n.</i> 赞扬; 表扬 |
| 10. reply [riˈplai] <i>v., n.</i> 回答; 答复 | 22. faith [feɪθ] <i>n.</i> 信任; 信仰 |
| 11. interrupt [ɪntəˈrapt] <i>v.</i> 中断; 打断 | 23. excellent [ˈeksələnt] <i>a.</i> 优秀的, 卓越的, 杰出的 |
| 12. Michigan [ˈmɪʃɪɡən] <i>n.</i> 密执安(美国州名) | 24. figure [ˈfɪɡə] <i>n.</i> 数字; 外形; 图表 |
| 13. associate [əˈsouʃiət] <i>n.</i> 副手, 合伙人 | 25. dollar [ˈdɒlə] <i>n.</i> 元; 美元 |

Notes

1. words 意为所说的话, 常用复数。