PATHOLOGICAL DIAGNOSIS
OF THE BODY OF
ANDREW ODELGA
Donora, Pennsylvania

1. Bronchopneumonia, acute, focal.
2. Bronchitis, acute, severe.
3. Tracheitis, acute, slight.
4. Chronic laryngitis, tracheitis, and bronchitis.
5. Emphysema of lungs, chronic.
6. Anthracosis of lungs and mediastinal lymph nodes.
7. Fat infiltration of myocardium of right ventricle, moderate.
8. Arteriosclerosis of coronary arteries, moderate; of aorta, marked; of cerebral arteries, slight.
9. Fatty degeneration of liver.
10. Arteriolar nephrosclerosis, slight.
11. Arteriosclerosis of spleen and kidneys.
13. Adhesions, focal fibrous, left lung to parietal pleura.
14. Sclerosis of leaflets of mitral and aortic valves of heart, non-deforming.
15. Adenoma of thyroid.
16. Fat infiltration of pancreas, slight.
17. Tubercles, miliary, healed (calcified), of spleen.

OPINION:
The death of Andrew Odelga, in my opinion, resulted from a combination of acute inflammatory disease of the respiratory system and chronic degenerative lesions of the lungs and cardiovascular system. The cause of the bronchopneumonia and bronchitis was not apparent; bacteria could not be visualized in tissue sections of the lungs. Qualitatively, the lesions were not unlike those which may follow inhalation of certain irritating chemical substances. It is my further opinion that the magnitude of the acute inflammatory disease was such that it could scarcely have caused the death of Andrew Odelga in the absence of the contributing chronic pulmonary emphysema,
coronary artery sclerosis, myocardial fibrosis, and fat infiltration of the myocardium.

Analyses of tissues for several metals and for fluoride revealed no data that can be considered conclusive from the standpoint of the etiology of the acute disease of the respiratory system. Large amounts of fluoride were found in the tissues, but the quantities, distribution, and absence of lesions commonly associated with fluoride poisoning lead to the opinion that the fluoride which was found was of adventitious origin.

Frank R. Dutra, M. D., Pathologist
Kettering Laboratory, Cincinnati, Ohio
POSTMORTEM EXAMINATION
OF THE BODY OF
ANDREW ODELGA

A postmortem examination of the body of a white man, said to
be that of Andrew Odelga, was made at the Scherzha Funeral
Home, Doneca, Pennsylvania, on March 30, 1949. The examina-
tion was conducted by Dr. Arthur Vorwaid and Dr. F. R. Dutra,
and was witnessed by Dr. William David. The examination was
begun at 10:30 A.M. It was stated that Andrew Odelga had
died on October 30, 1948.

EXTERIOR OF THE BODY:

The body was that of a well-developed obese white man, and it
appeared approximately 65 years of age. The scalp was covered
with grey, straight hair. The eyeballs were covered with
embalmers' eye caps. There was postmortem shrinkage of the
bulbs of the eyes and clouding of the corneas. The ears were
normal. The nose was normal and the septum was intact. The
lips were rouged. There were a few carious teeth and many
teeth were absent. The abdomen was protuberant. The exter-
nal genitalia were partially dried and discolored. There was
partial drying and discoloration of the skin of the hands.

In the wall of the abdomen, 8 cm. right of the umbilicus was
an embalmer's trocar-wound tied with a white cord. Another
white cord passed into the subcutaneous tissues through a
small opening 11 cm. below the level of the right nipple, and
the other end of this cord passed out of the subcutaneous
tissues at a point 3 cm. below the point of entrance. On the
anterior aspect of the upper portion of the right thigh was a
vertical, sutured, embalmer's incision which was 12.5 cm. long.

INTERIOR OF THE BODY:

The mid-line fat was 3 cm. thick. There was a small amount
of embalming fluid in each of the body cavities. There were
numerous trocar marks in all of the abdominal organs, in the
diaphragm, in both lungs, and in the heart. The diaphragm
on the right side was at the level of the third intercostal
space, and on the left side was at the level of the fourth
rib. There were no adhesions in the right pleural cavity,
but there were a few fibrous adhesions binding the midportion
of the posterior aspect of the left lung to the parietal pleura.
The pleural surfaces were smooth and glistening. Near the center of the right leaf of the diaphragm was a
frayed, lacerated hole approximately 4 cm. in diameter, and
a small mass of liver tissue projected slightly through this
hole into the right pleural cavity. In the mass of liver
tissue which projected into the pleural cavity there were
several trocar marks. There were three smaller frayed holes
in the right side of the diaphragm, with masses of liver tis-
sue, which contained trocar marks projecting through them.

When the pericardium was incised, the entire left lobe of the
liver was found within the pericardial sac, together with a
mass of omentum and a part of the stomach. These organs
passed through a hole, approximately 9 cm. in diameter, in
the dome of the diaphragm. All of these organs pushed the
heart considerably to the left and upward, so that there was
marked compression of the auricles, of the pulmonary artery, and the ascending aorta. The ascending aorta was pushed to such an extent that its lumen consisted only of a small transverse slit. The mass of liver tissue in the pericardial cavity was 7 cm. x 7.5 cm. x 2.5 cm. and the mass of stomach was 9 cm. long. The hepatic tissue was lacerated by the embalmer's trocar, and fragments of the coronary ligament connected that portion of the liver in the pericardial sac with the under surface of the right side of the diaphragm. There were no adhesions associated with these postmortem abnormalities. The edges of the laceration through the diaphragm were quite rough on the anterior, right, and posterior surfaces, but on the left the edge was somewhat smoother. However, rough tags of muscle and fibrous tissue were visible at intervals along the entire edge of the laceration and there was no associated reaction or hemorrhage.

CARDEOVA SCULAR SYSTEM:

The heart was not enlarged, weighing approximately 350 grams. The heart chambers were not dilated and contained only a small amount of solidified blood. The myocardium of the right ventricle was 0.4 cm. thick, and the myocardium of the left ventricle was 2 cm. thick. There was considerable infiltration of fat into the myocardium of the right ventricle. The trocar had damaged the heart to such an extent that it was difficult to trace the coronary arteries, but these could be followed they showed moderate arteriosclerosis with calcification of some plaques. The lumens of these vessels were not markedly narrowed. The cusps of the mitral and aortic valves were slightly thickened, without significant deformity. The tricuspid and pulmonary valves appeared normal. The foramen ovale was closed. The constriction of the aorta, due to the postmortem upward displacement of the heart, has been mentioned above. When the aorta was opened, it was found that there was considerable arteriosclerosis along its entire length, with calcification of some of the plaques. There was no ulceration of the intima.

RESPIRATORY SYSTEM:

There was hyperemia of the submucosal tissues of the valleculae, and of the tissues covering the cartilage of the epiglottis. The mucosa of the larynx and trachea were pale grey and without evidences of inflammation or edema. Adherent to the mucosae was a small amount of thick, grey mucoid material in which there were numerous black specks. The mucosae of the bronchi were similar to those of the trachea and larynx, and there was a moderate amount of similar mucoid material in the lumens of the bronchi. The lungs were both well expanded and subcrepitant. There were no areas of consolidation. There were a few fibrous tags on the posterior surface of the midportion of the left lung in the region where the adhesions had been broken. The lungs were dark grey with prominent black pigmentation along the distribution of the subpleural lymphatics. The cut surfaces also had considerable anthracotic pigment. In the posterior portions of the lower lobes, the tissue was considerably more firm than elsewhere throughout the lungs, but portions cut from the posterior parts of the lower lobes floated in water and were not very well defined. The small bronchi and bronchioles were in some regions partially or completely filled with thick, grey mucoid material. There were no focal lesions in the lungs. The hilar and bifurcation lymph nodes were not enlarged, and
cut sections revealed only considerable quantities of anthra-
cotic pigment.

LIVER:

The abnormal shape of the liver, due to the left lobe and
portions of the right lobe having been forced through the
diaphragm during embalming, has been described above. The
capsule of the liver was smooth and glistening, except where
it had been damaged by the embalmer's trocar. The lobular
architecture of the liver was intact in the peripheral por-
tions, while in the central portions the architectural
markings were indistinct and there were a few small cyst-like
spaces due to the postmortem accumulation of gas. The gall
bladder appeared normal.

SPLEEN:

The spleen weighed approximately 150 grams. The capsule was
smooth. The cut surfaces were purplish-red with numerous
prominent grey follicles studding them. There were a few
calified milliary nodules throughout the spleen.

ADRENALS:

The adrenals were embedded in large masses of fat. Multiple
sections revealed complete lysis of their medullae. The cor-
tices appeared normal.

PANCREAS:

The pancreas was average in size and had the usual shape.
There was a small amount of fat infiltration of the pancreas,
but no other abnormalities were noted.

URINARY SYSTEM:

The kidneys were average in size and had thin capsules which
stripped with moderate difficulty, leaving finely granular
surfaces. There were a few small subcapsular cysts ranging
up to 0.8 cm. in diameter. These cysts contained clear fluid.
A few cysts of similar nature were found in the region of the
cortico-medullary junctions of the cut surfaces. The corti-
cal striations were indistinct and the cortical tissue ranged
from 0.3 to 0.5 cm. in thickness. The medullae appeared nor-
mal. There was a moderate increase in the amount of peripelvic
fat. The pelvies and ureters appeared normal. The urinary
bladder was empty and its wall and mucosa appeared normal.

GASTRO-ENTERIC TRACT:

The esophagus and stomach had normal mucosae which showed no
evidences of inflammation or alteration. The stomach was
empty. The small intestine contained small amounts of thick,
brownish yellow material in several places, but for the most
part the lumen was empty. The mucosa appeared normal. The
appendix was normal. The transverse colon contained a small
amount of fecal material. The remainder of the large intes-
tine was empty. The mucosa of the large intestine was normal
throughout.
THYROID:

In the left lobe of the thyroid was an encapsulated mass of tissue which was 2.8 x 2.1 x 2.0 cm. This mass was slightly more firm than the adjacent thyroid tissue, and appeared to be comprised of thyroid acini together with increased quantities of dense interstitial collagenous tissue.

HEAD:

The scalp and skull were normal. The brain was average in size. The vessels at the base of the brain showed slight arteriosclerosis without significant narrowing of the lumens. The meninges were thin and glistening. The external surfaces of the brain, and multiple cut sections, revealed only normal architectural structures. The pituitary was removed and appeared normal in all respects.

MICROSCOPIC EXAMINATION:

HEART:

There was moderate fat infiltration of the myocardium of the right ventricle, and there was also slight perivascular fibrosis in the regions adjacent to many small vessels within the myocardium. There was slight hypertrophy of the myocardial fibers.

The myocardium of the wall of the left ventricle revealed considerable perivascular fibrosis, as well as small focal areas where there was dense fibrosis and dropping out of myocardial fibers. Most of the myocardial fibers were moderately hypertrophic and were well preserved.

Sections through branches of the coronary arteries revealed moderate sclerosis, with focal regions of calcification in the walls. The lumens were patent and there was no evidence of thrombosis.

RESPIRATORY SYSTEM:

The mucosa overlying the epiglottis was intact. There was engorgement of the blood vessels of the mucous membrane of the epiglottis, and there was infiltration of moderate numbers of lymphocytes and plasma cells in this region. There was mucinous degeneration of the cells of the mucous glands of the epiglottis and there were a few lymphocytes infiltrating these glands.

The epithelial lining of the larynx was intact, and many of the cells of the pseudo-stratified columnar epithelium were filled with mucus. There was infiltration of lymphocytes and plasma cells, and occasional polymorphonuclear leukocytes, into the tissues of the mucosa. Adherent to the epithelial lining, in some places, were fragments of debris in which there were desquamated epithelial cells and numerous polymorphonuclear leukocytes.

The epithelial lining of the trachea was intact. There was marked engorgement of the mucosal and submucosal blood vessels, and the mucosa was infiltrated with moderate numbers of lymphocytes and plasma cells, as well as occasional polymorphonuclear leukocytes.
Autopsy D-1: 7

There was intense congestion of the vessels throughout the lungs. The capillaries of the alveolar septa were markedly engorged. There were numerous areas in which there were extravasated erythrocytes in the alveoli, and while many of these may have been due to embalming since there was no associated reaction, there were some areas in which there were hemorrhages associated with numerous polymorphonuclear leukocytes. There were several focal areas in which there were groups of alveoli which contained polymorphonuclear leukocytes within their lumens, together with fibrin and debris. These areas of pneumonitis were usually in the peribronchial regions, and most of the associated bronchi had mucopurulent exudate within their lumens. There were occasional fairly extensive areas where the alveoli were filled with edema fluid. There were some bronchi and bronchioles throughout the sections which appeared normal. Most of the bronchi and bronchioles had their lumens partially or completely filled with exudate comprised of polymorphonuclear leukocytes, fibrin, and mucous. There were also, in the lumens of some of the bronchi, numerous desquamated epithelial cells. Some of these bronchi had walls which were not infiltrated by cells of exudate, but most contained moderate to large numbers of polymorphonuclear leukocytes and lymphocytes in their mucosae and submucosae. There was a considerable amount of anthracotic pigment scattered throughout the lungs in focal areas without appreciable increase in the amount of fibrous tissue present. There was no evidence of silicosis. The alveoli in some sections were markedly expanded, with attenuated walls, and there was fragmentation of occasional walls. There was no evidence of the changes usually associated with bronchial asthma or with bronchiectasis. Bacteria were not demonstrated in sections of the lungs.

A section from a lymph node from the area of the bifurcation of the trachea revealed several foci of hemorrhage and considerable anthracotic pigment.

AORTA:

A section through the wall of the aorta, in the region of the constriction of the ascending portion of the arch, revealed the presence of arteriosclerotic plaques and diffuse thickening of the intima. In addition, there was postmortem fragmentation of the intima in the region where the constriction was most severe. The tunica media and adventitia appeared normal.

DIAPHRAGM:

A section through a portion of the diaphragm, which included the edge of the hole through the central region of the diaphragm, revealed no premortem abnormalities. The fragmented edge of the diaphragm had no hemorrhage or reaction associated with it, so that the laceration of the diaphragm had been made after death.

LIVER:

There was marked fatty degeneration of the liver, and in addition there was infiltration of the periportal connective tissues with moderate numbers of lymphocytes and plasma cells. In some of the blood vessels there were clumps of basophilic bacteria. There was no evidence of reaction to the bacteria.
SPLEEN:
The sinusoids of the spleen were markedly congested with partially disintegrated erythrocytes. There was marked sclerosis with hyalinization of the thickened arteriolar walls. In the section examined there was one dense fibrous, hyalinized nodule of collagenous tissue.

PANCREAS:
There was no evidence of premortem disease, and well preserved islands of Langerhans' were visible here and there. There was considerable postmortem autolysis of the tissue.

ADRENAL:
Normal cortical tissue, lytic changes in medullary regions.

KIDNEY:
Sections through both of the kidneys revealed similar architecture in each. The glomeruli and the tubules were well preserved. A few of the collecting tubules had amorphous, eosinophilic material within their lumens. There was moderate diffuse fibrosis of the pyramids. The preglomerular arterioles were markedly sclerotic, and there was thickening of the walls of many of the larger arteries. A section through one of the cysts seen grossly revealed a flat epithelial lining, without reaction of the adjacent tissues. There were a few foci of lymphocytic infiltration in the peripelvic tissues.

URINARY BLADDER:
A section through the wall of the urinary bladder revealed the mucosa to be intact. There were a few lymphocytes infiltrating the superficial portions of the mucosa, but no other abnormalities were noted.

THYROID:
A section through the nodule of the thyroid which was noted grossly revealed it to be comprised of small acini with flat epithelial lining cells. The staining reaction of the colloid in the acini varied from dark pink to quite pale. There was considerable fibrosis within this nodule. There was no evidence of malignant change.

CENTRAL NERVOUS SYSTEM:
Sections from various levels of the brain, including the regions of the respiratory centers and of the upper portion of the cervical region of the spinal cord, revealed no abnormalities; other than slight postmortem changes in the ganglion cells.

ANALYSES OF TISSUES:
See attached sheet for results of analyses.
**Material**

Source: Body D-1 (Donora, Pennsylvania. Smog disaster investigation)

Submitted: 11-13-49 by Dr. W. P. Ashe and Dr. F. Dutra

Required: Metal Analyses

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* On ash basis = 0.3% F

Reported: 8-8-49
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Source: Autopsy Material, Donora, Pennsylvania
Submitted: 10-10-49 by Dr. Frank Dutra
Required: GO Detection

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