

CASE 6.—E. M. W., a man, aged 38, examined, April 10, 1923, whose previous history had no apparent bearing on the condition complained of, about March 15 first noted failure in vision. For about a month previously there had been some paresthesia of both legs. Vision had failed gradually until, when examined, he could read print with difficulty. Previous to the first examination, he had been working for several weeks around the distillate tanks of an oil refinery.

Vision in the right eye was 3/XXX; in the left eye, 2/XXX. Ocular movements and pupillary reflexes were normal. Both fundi showed some blurring of the disks, and the vessels were slightly dilated and more tortuous than normal. The macular area of the left eye and the margins of both disks showed areas in which a slight amount of exudate was present. Neurologic examination was negative. Visual fields showed greatly enlarged blind spots, which partially included fixation areas.

In the course of two months, vision had improved and the defects of the field charts had receded. The character of the visual defect, the condition of the fundus and the history and progress of the case all indicated a toxic etiology, producing a retrobulbar neuritis, showing some evidence of disturbance in each optic disk.

CASE 7.—J. L. H., a man, aged 41, examined, March 17, 1923, whose previous medical history was unimportant, was struck on the head by a piece of rock, March 16, 1922, causing depressed fracture in the right parietal area. The brain was found to be under increased pressure at an early operation. Headache was noted in November. His complaint, when examined, was impaired vision, particularly difficulty of seeing objects to his left.

The vision of each eye was 6/XXX, increasing to 6/IX with correcting lenses. The media were clear. The disks of both eyes were slightly hazy, more marked in the right eye. The vessel walls appeared thickened and more tortuous than normal, but of about normal caliber. The fields of vision showed a left homonymous hemianopia with concentric contractions. The visual areas of each field came exactly to the media line, and extended upward and downward and to the right in each field about 10 degrees. The visual areas were symmetrical and could be superimposed. Comparison of the fields taken with the patient at 300 cm. from the screen with those taken at 55 cm.—both with test objects of 5 mm.—showed a marked difference in size, but this was not proportionate to the difference in distance. This may be explained by the fact that the test object used at a greater distance is relatively smaller.

The outstanding feature in this case is the left homonymous hemianopia, which is complete. There is also a very marked constriction of the right fields of both eyes. The seeing fields as charted on the screen are nearly equal and superimposable. The hemianopia, considered with the pupillary reflexes, indicates a lesion on the right side of the brain, posterior to the primary optic centers. The constricted right fields and a slight evidence of fundus

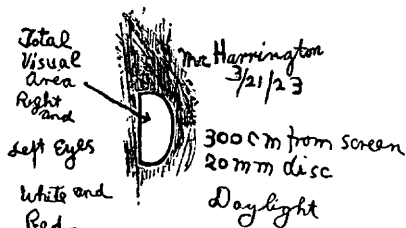


Fig. 7 (Case 7).—Plate 2, March 21, 1923: Compare Plate 1. Visual fields taken at 300 cm. from screen; 5 mm. disks used. Proportionate enlargement with increased distance not absolute; 30 mm. disk should have been used.

changes are probably to be explained by damages to the optic nerve from previous general intracranial pressure.

CASE 8.—M. H. D., a man, aged 35, examined, April 27, 1923, was in our aviation service during the war. Vision in the right eye was 6/IV; in the left eye, 6/XXX plus 1. Until a few weeks previous to examination, he had had no trouble with his eyes; then he began to notice blurred vision of the left eye.

Examination showed a macular change in the left eye suggestive of minute hemorrhages that have largely absorbed, leaving irregular, mottled appearances of the retina in this area. In the lower nasal temporal margin of the disk, how-

ever, there was a depressed, slightly pigmented portion about one fourth of the disk in size and extending slightly into the scleral margin.

Whether the defect was a congenital coloboma or an early stage of melanotic neoplasm of the optic nerve could not be determined. The field showed no appreciable abnormality, with the exception of an elongation of the outline of the left blind spot corresponding to the defect as seen with the ophthalmoscope.

CASE 9.—Mrs. B.'s case is an example of hemorrhagic glaucoma, and shows clearly the "nasal step" quite charac-

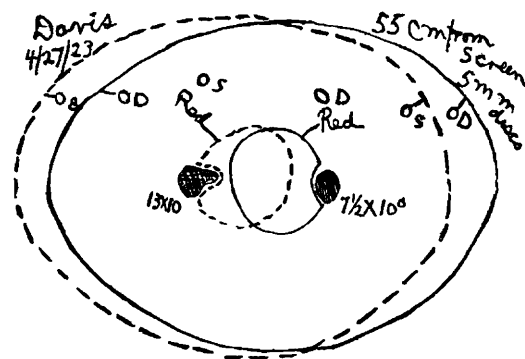


Fig. 8 (Case 8).—April 27, 1923: Intra-ocular findings, slightly pigmented cup-shaped depression, outer lower margin of left optic disk. Visual fields: Right eye: 1. Slightly enlarged blind spot, 7.5 by 10 degrees. 2. Normal peripheral fields. Left eye: 1. Prolongation of blind spot above and toward center of fixation. 2. Normal peripheral field. Ocular diagnosis, coloboma, marginal, left optic nerve.

teristic of this condition. There was some contraction of the field of vision and a slight enlargement of the blind spot, together with restrictions of the color fields in each eye.

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## TUBERCULOSIS OF THE OS COCCYGIS

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The pathologic changes in tuberculosis of the spine are well known, and the clinical picture of the disease is recognized without much difficulty. In contrast, tuberculosis of the os coccygis presents a rather characteristic pathologic picture, which has been but seldom described and is generally unrecognized clinically. This has led to failure of diagnosis, years of invalidism in the patients thus affected, and futile operative procedures for the cure of the lesion. The literature of the subject is sparse. Darrah<sup>1</sup> compiled twenty cases in 1893, and in 1904-1905 Caubet<sup>2</sup> reported three cases he had observed and reviewed twenty-five cases compiled from the literature, including Darrah's. With the exception of these reports, only one reference to the subject has been found since 1905.

The histories of two patients observed during the past year will be given, as they illustrate well the essential pathology and clinical picture.

CASE 1.—Mrs. A. T., aged 60, seen with Dr. J. A. Chilcott for examination of an indurated area in the rectum which suggested carcinoma, complained of discomfort in the rectum and vagina and a very painful back low down over the sacrum, which was especially marked on sitting or on attempting to arise from a sitting position. She had been weak and had not been sleeping well. The pain was first noticed in November, 1921. It was intermittent at first, and then became constant. It was worse after sitting, and was not increased by bowel

1. Darrah, R. E.: Boston M. & S. J., 1893, p. 36.

2. Caubet, H.: Rev. de chir. 30:201-369, 1904; 31:643, 1905.

movement. Discharge from the rectum had been noticed occasionally in the morning. She had never had an abscess in the ischio-rectal region.

The general history was negative. She had had hemorrhoids for years. A general physical examination, including a pelvic examination, was negative for pathologic changes. Rectal examination revealed an indurated area the size of a pea above the sphincters on the posterior wall of the rectum.

Under procain, 0.5 per cent., the rectum was anesthetized. A probe passed into the sinus went backward toward the sacrum and coccyx, but did not touch denuded bone. Barium paste injected into the sinus came out higher up in the bowel lumen. Tissue was curetted from the sinus for microscopic examination. Up to this point, it was thought probable that a foreign body had perforated the bowel, causing an abscess in the hollow of the sacrum, and that this had secondarily reperforated into the rectum

through the sinus low down in the rectum. Stereoscopic roentgenograms of the pelvis were taken with a probe in the sinus and with barium injected into the sinus, but no involvement of bone was made out. At this point, the sections from the tissue removed were examined, and the granulation tissue was found to be tuberculous. Repeated examination of the spine and pelvis and urinary tract revealed nothing. Thinking that more adequate drainage of this abscess would give the patient some relief from the constant discomfort she was experiencing, I passed a heavy piece of silk through the lower opening of the sinus in the bowel to the upper opening of the sinus, which was just above one of Houston's valves, and this silk was tied tightly in the hope of cutting through the intervening tissue. This result was obtained in a few days, and some relief was afforded; but in a short time all of the symptoms returned. The patient felt that perhaps hemorrhoids, which were bleeding and protruding, were the cause of the pain; and though doubting this, I removed them at another operative session under local anesthesia. This procedure did not relieve the pain. About this time, a very slight redness developed over the coccyx. This was only suggestive, but, owing to the tenderness in this region, I decided to explore the coccyx. Under gas anesthesia, an incision was made over the coccyx and a pus pocket was entered. The coccyx was the seat of an osteomyelitis, and the lower two segments of the sacrum were removed. The patient obtained almost instantaneous relief, and at present, about eleven months from the time of the removal of the coccyx, she is symptom free and has gained in weight and strength. She still has a small sinus, which reaches to the rectum, but apparently does not connect with it. This sinus is becoming progressively smaller. The microscopic examination of the coccyx revealed a tuberculous osteitis.

CASE 2.—R. G., a man, aged 47, referred by Dr. Carl H. Dragstedt, complained of a discharging perirectal sinus and pain in the back and rectum, loss of weight, weakness and marked constipation. During the last ten years, he had had three perirectal abscesses opened, and six years ago had an

extensive operation performed for fistula in ano, which resulted in a partial incontinence of the sphincters and left him with pus discharging from three external openings in the right ischio-rectal fossa, as well as a pus discharge from the rectum which necessitated frequent changes of dressings. Bowel movements had been induced by catharsis to avoid constipation, which caused severe pain during and after bowel movement. For several months, severe pain in the lower spine had made it difficult for the patient to sit down with comfort. He had lost 20 pounds (9 kg.), and had an afternoon rise of temperature. He had been drinking heavily to relieve the pain.

Examination showed no constitutional disease. Around the anus on the right side were three discharging sinuses, which communicated with an indurated ulcer the size of a dime on the posterior wall of the rectum, just above the mucocutaneous line. In all of the lesions, a copious discharge of pus was

present, and the process had the clinical appearance of tuberculosis. The external sphincter muscle had been cut, and was incompetent. At the level of the ulcer, a stricture had developed which admitted the index finger snugly and which compensated for the incontinence of the sphincter. There was some tenderness over the coccyx exteriorly, but no swelling or redness. The appearance of the lesion was that of an ischio-rectal tuberculosis which had secondarily broken into the rectum.

Nov. 7, 1922, under gas-ether anesthesia, three ischio-rectal sinuses on the right side were dissected out and connected with the rectum low down outside of the sphincter. A probe in the rectal ulcer passed through the bowel wall posteriorly and then upward for 5 inches, but no denuded bone was touched. This rectal opening was dilated to insure better drainage. Section from tissue showed a microscopic picture of tuberculosis. Roentgenograms were now taken of the pelvis, spine, sacrum and coccyx, but no bone changes were seen.

The patient improved greatly as far as local discomfort was

concerned, but had a great amount of pus discharging from the rectal opening. His temperature was around 100.5 F. in the evenings. At this period, the patient went home, but returned in three weeks with a temperature of 104, profuse discharge from the rectum, and marked tenderness over the coccyx and over both ischio-rectal regions. Examinations, including roentgenograms of the sacrum and coccyx, revealed no additional findings except a slight hyperemia over the region of the coccyx, and some induration deep in the ischio-rectal region. Exploration of these regions was decided on.

December 14, under gas-ether anesthesia, the coccyx was exposed by an incision directly over it, and when the posterior ligaments were divided, the whole coccyx was found lying free as a complete sequestrum. Through its bed, a sinus ran anteriorly to the ulcer in the rectum and laterally into the ischio-rectal fossa on each side, where well walled off abscesses, deep in the fossae, were drained by separate incisions through the ischio-rectal fat. The sacrum was not involved. All wounds were left wide open.

Sections of the os coccygis showed tuberculosis of long standing.

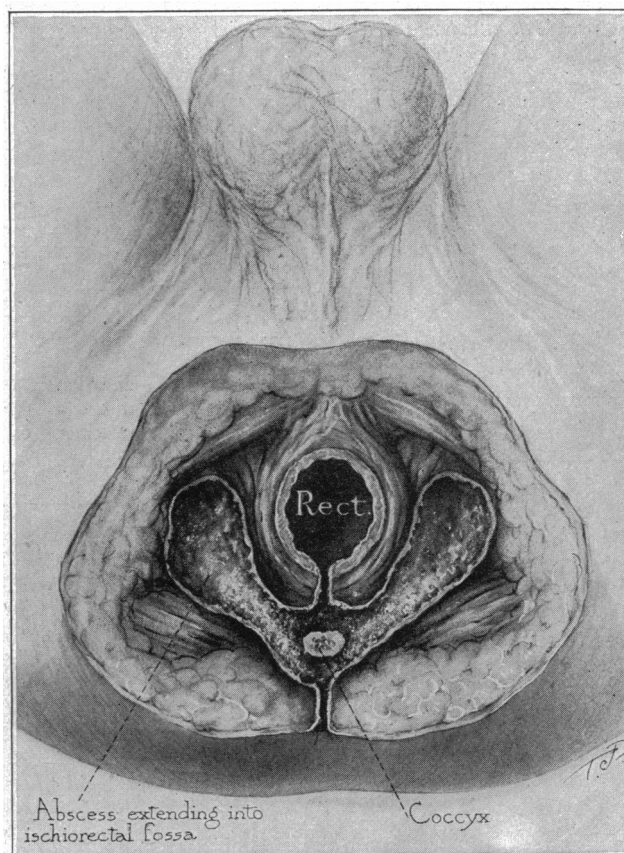


Fig. 1.—Extent of tuberculous process from os coccygis (diagrammatic).

After the last operation, the patient's health at once improved. He has gained 20 pounds in the last four months, has no pain, and is actively at work. He has a slight pus discharge from the rectal defect, which is not entirely closed. There is also a small sinus in the scar of the incision over the coccyx. This is gradually becoming smaller.

In neither of these two cases was a history of trauma present; nor was there any known reason for localization of the tuberculous process in the os coccygis. It might be supposed that the tuberculous process in the bowel was primary and the involvement of the bone secondary. Opposing this view are the facts that the lesions in the bowel were more recent than the bone changes in both cases, as the coccyx was completely sequestered. In addition, primary tuberculosis of the rectal mucosa without pulmonary or other intestinal tuberculosis is extremely rare. Lastly, the rectal lesions were not active ulcerative processes, but were openings of fistulas into the bowel.

If the tuberculosis of the os coccygis is considered in the light of the twenty-seven reported cases, it is found that seventeen patients were men and ten were women, and that the age of the patients has varied from 21½ years to 70.

Traumatism to the coccyx by falls or injuries has been mentioned in ten cases, but the active symptoms of tuberculous osteitis have not developed at once but following the trauma from three months to six years. The latter time limit obviously throws some doubt on the importance of trauma as an etiologic factor. It would be fair to assume that it played about the same rôle as it does in the production of bone and joint tuberculosis elsewhere.

The general health of the patients prior to the onset of symptoms of the local lesion has been good, and generalized tuberculosis has been conspicuously absent. The onset of the lesion is usually insidious, and the patient first suffers backache, which is over the sacrum and coccyx. Difficulty of locomotion, and inability to rise from a sitting position due to discomfort as well as tenderness over the coccyx while sitting, are early symptoms. Defecation is usually not painful.

Abscess formation is constant and usually develops insidiously as a chronic inflammatory swelling, finally reaching through the skin over the coccyx or more rarely, as evidenced in the two cases just reported, into the rectum. When the abscess finally opens externally, a rather copious seropurulent discharge continues from it. If the abscess opens into the rectum, a secondary infection may supervene with fever, prostration, loss of weight and all of the findings of an acute infection. Usually the course of the infection is of slow progress, and the disease continues for years until the dead bone is removed or, rarely, is discharged spontaneously, as occurred in one patient.

#### PATHOLOGY

Tuberculosis of the os coccygis usually develops as the sole known lesion of tuberculosis in the patient, and is probably a hematogenous infection. Secondary involvement of the coccyx by extending from tuberculosis of the spine or sacrum is very rare.<sup>3</sup> Likewise, when tuberculosis of the coccyx has been observed, the sacrum has been uninvolved except in three cases observed by Caubert and Darrah and in one of the cases reported in this article.

The essential pathology of tuberculosis of the coccyx is that of bone tuberculosis elsewhere, resulting in bone necrosis and cold abscess formation. In cases of several years' standing, the coccyx is entirely sequestered and lies free, encased in the fibrous capsule composed of the anterior and posterior ligaments. The cold abscess that forms has some very characteristic features in that it usually forms on the anterior wall of the coccyx and secondarily takes three courses. It may rupture into the rectum, as it did in the two cases here reported. The site of rupture into the bowel is above

the sphincters in the lower portion of the ampulla of the rectum. In one of the cases there were two openings into the rectum. More frequently, the abscess gravitates downward and points at the tip of the coccyx in the midline just posterior to the anus. The third location for the cold abscess to gravitate is into one or both ischio-rectal fossae. When this happens, the abscess lies deep in the fossae just below the levator ani muscle, and may reach considerable size before any external transformation or color changes in the skin occur. Finally, these ischio-rectal abscesses reach the surface and ulcerate through the skin, making sinuses into one or both ischio-rectal fossae.

If the abscess ruptures into the rectum, secondary infection of the whole abscess cavity results, and a rapidly spreading acute pyogenic infection may occur.

#### DIAGNOSIS

The diagnosis of tuberculosis of the coccyx is generally not made, though, I believe, the condition is present more often than is suspected and is responsible for a number of persistent tuberculous sinuses in the ischio-rectal region. It must be thought of in patients having backache and discomfort in the back while sitting or in the act of rising from a sitting position, who have a chronic discharging sinus in the ischio-rectal region. Pain on pressure over the coccyx, either externally or through the rectum, in such a case is contributory evidence, and a sinus developing in the midline over the coccyx or at its tip is very suggestive. The roentgen ray, peculiarly enough, is not very helpful. A series of stereoscopic plates was made in both of my cases,

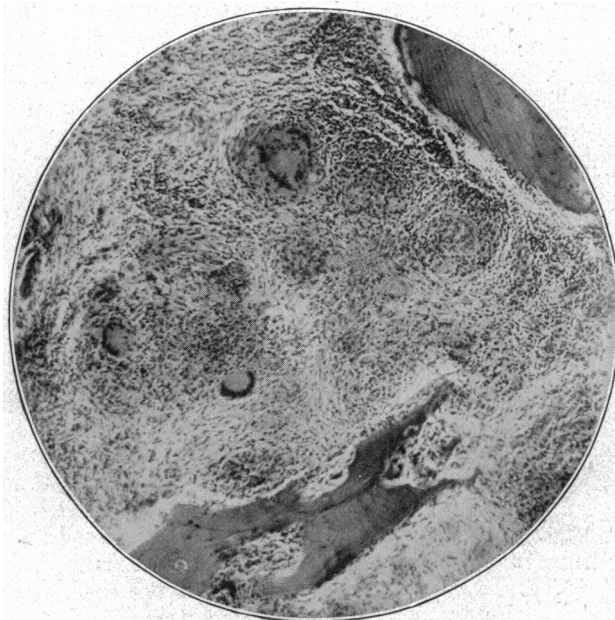


Fig. 2.—Tuberculosis of os coccygis, as shown on microscopic examination.

3. Conta: Thèse de Paris, 1887. Lamelegue: Tuberculose vertébrale, Paris, 1883.

with negative results. This is due to the difficulty in getting a clear picture of the coccyx and, more especially, because there is practically no new bone formation and also that the sequestered coccyx is not especially deformed in the early stages of the disease and still contains a considerable amount of calcium salts.

The passage of a probe through an ischiorectal sinus toward the coccyx which touches dead, denuded bone, is pathognomonic.

One of the most important points in diagnosis is to think of the fact that the coccyx may be the seat of a tuberculous osteitis.

The differential diagnosis must exclude pyrogenic fistula in ano, the origin of which is an acute, rapidly developing ischiorectal abscess, which differs materially from the insidious onset of the tuberculous process. The internal opening of the ordinary fistula in ano is at the mucocutaneous line between the sphincters and the external opening, and allows a probe to be introduced into it toward the rectum and away from the coccyx.

Tuberculosis of the ischiorectal fat is harder to differentiate. It is more common than tuberculosis of the coccyx, and usually develops more superficially, with the appearance of several nodular masses, which coalesce and break down to form sinuses over one or both ischiorectal fossae. The involvement of the rectum is usually secondary, owing to the process rupturing into the rectum by continuity. In this, it resembles tuberculosis of the coccyx. Every such ischiorectal tuberculosis should be examined to determine where the coccyx is tender and as to whether a probe intro-

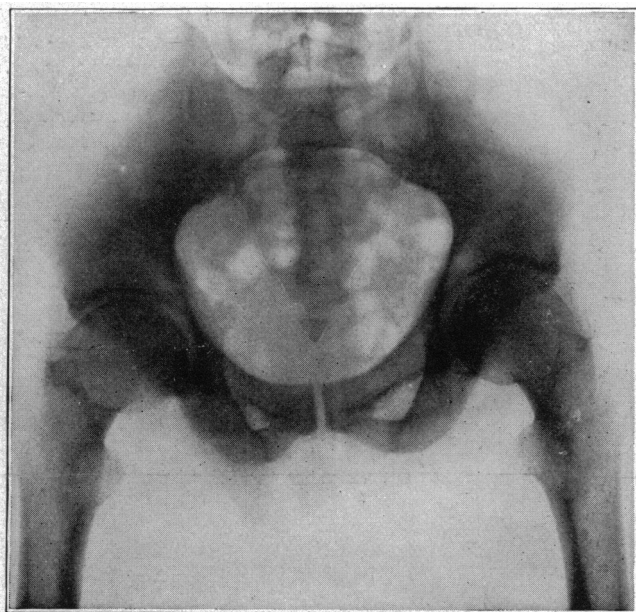


Fig. 3 (Case 1).—Relatively normal os coccygis.

duced into the sinus touches denuded bone. Tuberculosis of the ischiorectal fat rarely has a sinus in the midline posteriorly.

The sinuses of a pilonidal cyst are present at the sacrococcygeal articulation in the form of posterior anal dimples or depressions, and these are characteristic. If the pilonidal cyst becomes infected, and it generally does, the abscess may rupture through the lining of the original cyst carrying part of the cyst wall into one or both ischiorectal fossae, where new cysts are generated,

and the lesion thereby becomes large. I have seen the entire ischiorectal fossa filled with such a tumor. The underlying bone is rarely involved, as it is protected by firm ligaments so that the course of least resistance is away from the coccyx and sacrum. The similarity of these two conditions lies in the position of a sinus in the midline over the coccyx.

Gravitating abscess from tuberculosis of the sacroiliac synchondrosis, Pott's disease, tuberculosis of the

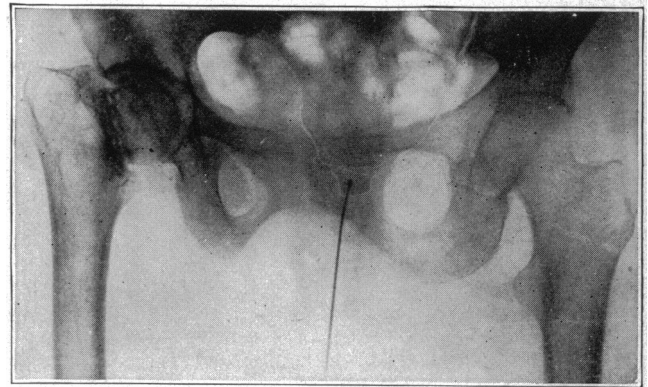


Fig. 4 (Case 2).—Probe through rectal opening of sinus running toward normal appearing os coccygis.

tubes or appendix and tuberculosis of the hip may rarely appear in the ischiorectal fossae, but concomitant symptoms of the original lesion will usually make the diagnosis possible.

Old fractures of the coccyx or pain in the region of the coccyx from chronic arthritis of the spine would be very easily recognized.

#### TREATMENT

The treatment of tuberculosis of the coccyx is removal of the coccyx by an incision over it. Jean Louis Petit reported the first case in 1790, and resected the coccyx.

In nineteen cases in which the coccyx was resected as reported by Darrah, sixteen of the patients recovered. In both of the cases reported in this paper the patients are symptomatically and generally well, but each one has a small sinus reaching from the incision to the bed of the coccyx. These sinuses are getting smaller, and seem to have every prospect of closing.

Where the abscess has opened into the rectum, a subsequent plastic operation to cover the defect may be necessary. The operation proposed by Elting, of sliding a flap of mucosa over the opening into the bowel, would be adaptable for this purpose.

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**Automobile Fatalities in United States, 1917-1922.**—The Department of Commerce announces that the returns compiled by the Bureau of the Census show that during the year 1922 11,666 deaths resulting from accidents caused by automobiles and other motor vehicles (excluding motorcycles) occurred within the death registration area of the United States (exclusive of Hawaii), which area contains 85 per cent. of the total population. This number represents a death rate of 12.5 per hundred thousand population, as against 11.5 in 1921, 10.4 in 1920, 9.4 in 1919, 9.3 in 1918, and 9 in 1917. In the twenty-seven states for which data for 1917 are available the number of these deaths increased from 6,014 in that year to 9,581 in 1922, the corresponding rates for these two years being 8.7 and 12.9.—*Pub. Health Rep.* 38:2889 (Dec. 7) 1923.