used, whenever an especially important heavy gun is firing. Other medium and heavy pieces in the same neighborhood will become especially active at the same time, in an effort to mask the effect of the giant and confuse the records of the detectors on the other side.

This was done by the Germans, when they opened fire on Paris with their long-range guns (commonly but incorrectly called Big Berthas) in the spring of 1918. These super-guns were very deliberate in their firing—half-a-dozen shots a day was about their usual quota. Whenever they were ready to get off a shell, all the mediums and heavies in the whole St. Gobain sector worked overtime for a while, to try to throw the French sound-ranging service off the track.

It didn't work. Before the bombardment of Paris had been going on for as much as thirty hours, the French had gained at least an approximate idea of the site of the two guns that were then doing the firing, had moved up railroad guns, and were beginning to drop heavy shells so close to the Germans' emplacement that the latter were sure they had been betrayed by spies. But it was all done by the comparatively crude sound-ranging method then in use, plus a couple of suspicious-looking spots on a chance airplane photograph taken before the shooting started.

It will be at least as difficult to fool seismic locators, and probably more so. No two earthquakes ever make identical records, and neither will two guns, even of the same caliber, send exactly the same shaped waves through the earth. Every big shot will have its own signature, distinct and unforgeable, for the scientists in uniform in the opposite lines to read. And it probably will not take long for them to arrange for a return of courtesies.

Science News Letter, April 6, 1940

A new-born *bear cub* is smaller than a new-born kitten.

INVENTION

U. S. Patent System Spurs Enterprise of the Nation

The Commissioner of Patents in Special Article Gives Background for Sesquicentennial Celebration

By CONWAY P. COE,
U. S. Commissioner of Patents

THE NATION is now celebrating the anniversary of an event that has grown steadily in importance down through the succeeding decades.

On April 10 in 1790 President George Washington approved the first United States patent law. With the enactment of that statute, which, by the way, he had urged as a help to inventors, our present patent system had its beginning.

That system, in turn, has spurred our advancement and not only has promoted our industrial welfare, but has also brought us social and political benefits great in number and significance. It has faithfully and fruitfully served the democracy that begot it.

There were inventors, of course, before 1790, and man's inventiveness long preceded our patent system. Down through the ages his ingenuity produced many useful contrivances. But for these there was no reward but their makers' sense of achievement. There was no material return, no protection; scarcely was there renown for the creators of these new mechanisms and methods.

Gunpowder has been for centuries both a beneficent and a baneful influence in the world, but the true identity of its discoverer is hotly disputed.

The American patent system has encouraged the use of good means to worthy ends. It has succeeded in profiting the whole nation by safeguarding and recompensing the individual. It has fulfilled the purpose which the authors of our Constitution had in view when they empowered Congress "To promote the progress of science and useful arts by securing * * * to inventors the exclusive rights to * * * their discoveries."

We owe to that incentive, I believe, the invention of the cotton gin only four years after the passage of the first patent law. As this stimulus became more widely known through the inventions it fostered and recognized, it prompted more and greater efforts and accomplishments.

Within a little more than fifty years after President Washington's approval of the law of 1790 came the telegraph, the reaper, the vulcanization of rubber, the revolver, the sewing machine and the rotary printing press.

In the 104 years since the revision and refinement of the patent system in 1836, there have been granted 2,196,000 patents to many thousands of individuals, the vast majority of them citizens of the United States. Only 9,957 patents were issued before July, 1836.

Many of the inventions covered by these 2,196,000 patents supply our needs and serve our convenience every hour of every day. Such marvels as the telephone, the incandescent electric lamp, the phonograph, motion pictures, the submarine, the linotype, the airplane and the radio, including television, are covered by patents granted in the last 65 years, that is, since the birth of six or seven millions of Americans still alive.

In the first century following the establishment of our patent system 405,262 patents were issued. More than four times that number, that is to say, 1,799,000, patents were issued. More than four times alone. And it will be conceded, I think, that the inventions patented in the last five decades are no less important than any that went before.

The use of these inventions presupposes their production, distribution and operation. To make and merchandise them requires the investment of capital and the employment of labor. Many of our greatest industries are founded on

inventions. It is reasonable to believe that without these inventions we should not have the industries they created.

The word invention means to many people simply a machine that reduces or wholly displaces manpower and by that reduction and displacement raises economic problems and difficulties.

This subject is too big for complete discussion here, but I can give a generalization. We are not yet blessed—or cursed—with machines that make themselves. Those now in service had to be constructed of raw materials which had to be produced and transported and fashioned to requirements. All of these processes necessitated human effort.

In short, man is prior and indispensable to the machine. You can have man without a machine, but you can never have a machine without man.

The moral which this anniversary impresses on me is that patents have put a premium on genius, and all of us have shared the gains. Every successful invention becomes a new inspiration. While that impetus continues we may count on progressive improvement in our way of life.

Science News Letter, April 6, 1940

ANATOMY

Human Embryo in Third Week Added to World's Collection

Minute Creature Only Sixtieth of Inch in Diameter Is Complex in Structure; Football Affects Blood

A HUMAN embryo in the third week of its prenatal existence has been added to the world's small collection of invaluable specimens showing earliest stages in development of the human body. Microscopic sections of it were shown to the meeting of the American Association of Anatomists in Louisville, Ky., by Prof. John S. Latta of the University of Nebraska.

The almost pinpoint sized embyro (it is only about a sixtieth of an inch in diameter) was embedded in tissue which had to be removed from a patient in a Nebraska hospital. Serial sectioning disclosed its presence, and showed a considerable complexity in structure despite its minute size and brief period of development.

Science News Letter, April 6, 1940

Football in the Blood

FOOTBALL "gets into the blood" of the players in a much more literal sense than the usual use of the phrase connotes, it was shown by studies of the blood of football men reported by Dr. Edmond J. Farris of the Wistar Institute of Anatomy and Biology, Philadelphia, to the American Association of Anatomists at Louisville, Ky.

Dr. Farris took samples of blood from a number of football players before and after games throughout a hard playing season and made comparative counts of the red corpuscles and of several types of the white corpuscles. He found definite changes every time a game was played.

Until mid-season, football had a destructive effect on the red corpuscles; there was an average drop of 822,000 cells per cubic millimeter following each game. From mid-season on, however, the picture reversed itself, with an average increase of 618,000 red cells per cubic millimeter until the end of the season.

Both physical exertion and emotional stress showed their effects in changes of white blood cell numbers. Dr. Farris suggested that white corpuscle counts might possibly be used to give a quantitative measurement of fatigue and exhaustion effects.

Science News Letter, April 6, 1940

Maine's trout fishing season legally opens "when the ice goes out."

INDIAN MYSTERY

ARCHAEOLOGY

Mexico's Great Stone Heads Provide New Indian Mystery

FIVE great stone heads, each weighing more than 20 tons, are the newest ancient American mystery.

Unearthed in Mexico by a joint expedition of the National Geographic Society and the Smithsonian Institution,