

AN IMPROVED BICYCLE.

The accompanying illustration represents a bicycle having internal gear by means of which, from the pressure of the feet on the pedals, greatly increased speed is obtained over that to be had with an ordinary crank wheel of the same diameter. It has been patented by Messrs. Wilber W. and Horace Spencer, of Piqua, Ohio. The fork of the bicycle, which is secured to the spindle of the wheel, has rigidly fixed thereon a casting, in the center of which is the bearing of an internal gear crown wheel meshing with a spur wheel fixed to the spindle of the bicycle wheel, the crank being connected to the spindle of the crown wheel. The casting can be readily attached or removed, and its connecting parts greatly strengthen the portions of the vehicle where the greatest strain comes, while a removable cap or cover serves to protect the operating parts.

CHESLEY HEAL, THE CENTENARIAN.

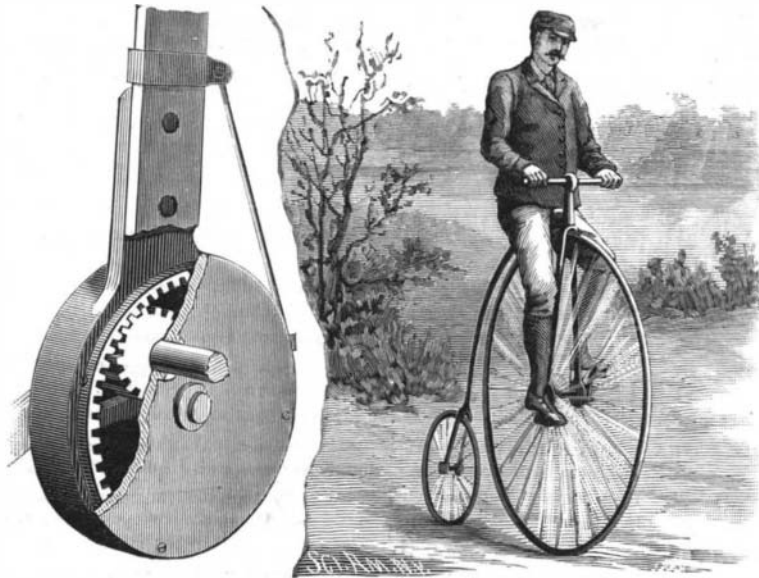
From time to time we have published accounts of wonderful cases of longevity, and the subject of this sketch deserves a high place in our gallery of centenarians. Chesley Heal was born at Westport, Me., on November 16, 1778, and died at Searsmont, Me., October 6, 1888, nearly completing the almost unprecedented term of 110 years. Of his father's family not much is known. His mother came from England at the age of 14 years, and he had three brothers and one sister. He was married twice, and had four sons and one daughter by his first wife, none by his second. His son Isaac died during the rebellion, another died at home, another was lost on a whaling voyage, and the remaining son is still living. There are fourteen grandchildren and fourteen great-grandchildren, all living. The early part of Heal's career was a very active one. He was a soldier in the war of 1812, and served in the division stationed along the coast of Maine at Lincolnville, Northport, and Belfast. He was at Belfast when the British forces, under Major-General Gasselin, crossed the Penobscot Bay from Castine and captured the town. The English force consisted of 700 picked men, of almost equal height, who had served under Wellington. The small American regiment was unable to cope with this force, and no opposition was offered to the landing of the troops. Owing to this fact, the British commander gave orders that the people should not be molested, and that all provisions should be paid for, which was accordingly done.

In 1823, Heal purchased a farm of several hundred acres, at Searsmont, near Belfast. He determined upon clearing and developing this land, and turned all his energies to that end. He took great interest in raising cattle, and his farm was usually in a good state of cultivation. He was very frugal, very industrious, almost parsimonious in his style of living, and as he was considered a successful farmer, it was anticipated that during so long a life his accumulations would be considerable, but at his decease very little was discovered, and what has become of his wealth nobody knows. Some suspect that he buried his money, and as he never confided it to any one, his secret died with him.

He took quite an active interest in politics, and was a staunch Democrat, having voted at every election from 1800 to 1880. His first vote was cast for Thomas Jefferson. Possibly his absolutely quiet life had something to do with his longevity. He rarely left his own neighborhood, and never, it is said, traveled on a steamer or on a railroad train. He never saw anything of the turmoil and bustle of the world, and his nerves were never disturbed. He was quite unlettered, being unable to read or write. He kept his accounts by peculiar marks on his barn door, which he alone understood. His memory was highly cultivated, owing to the constant calls made upon it on account of his being unable to read and write, and this aided him in keeping his accounts.

Physically, he was well proportioned and strongly built. He was five feet eight inches in height, and weighed normally about 175 lb. He had a full, well developed chest. He was a great talker, and had a loud voice. His health was so perfect that during his whole life he was only once visited by a physician until his last illness. His eyesight and hearing continued unimpaired until the end. His hair did not turn gray until he had experienced the frosts of a hundred winters. He

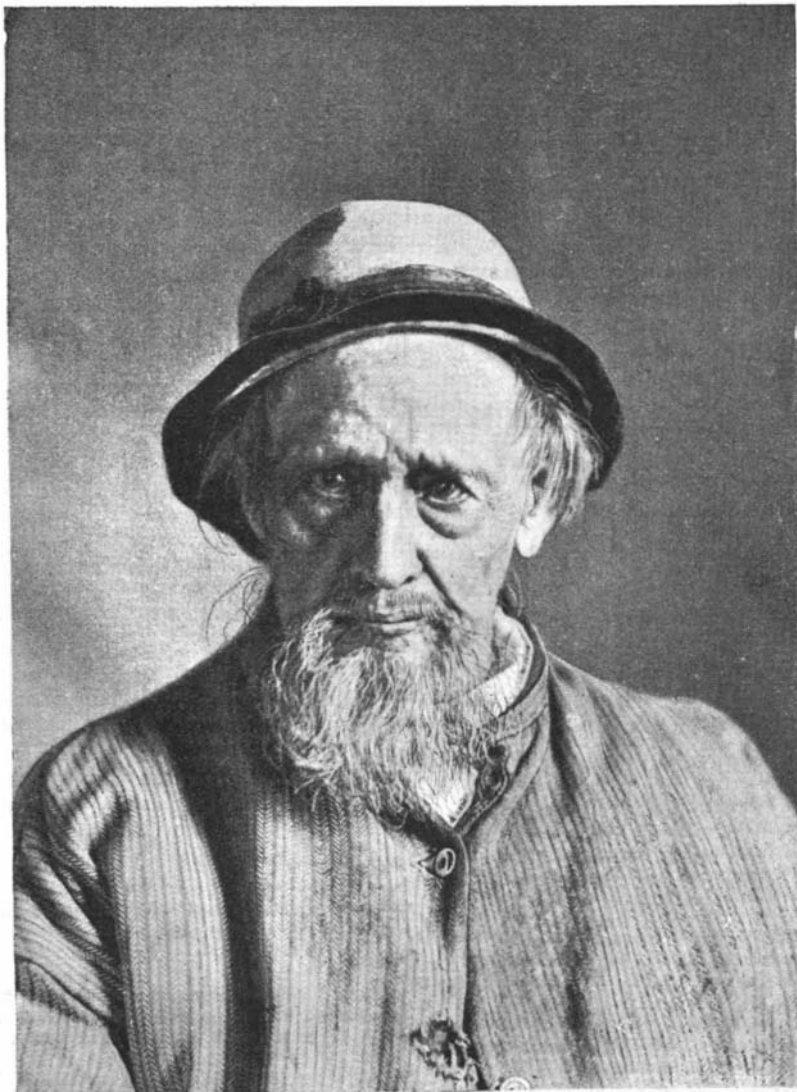
was a remarkably good sleeper, retiring usually at sunset and rising at dawn. He was a good eater, living on fresh meat during the autumn and early winter when the farmers were slaughtering, but during the summer his diet was principally salt pork cut into slices and fried. The bread on his table was made from wheat, rye, corn, barley, and buckwheat from his own farm. He used tobacco nearly his whole life. He preferred to chew rather than smoke the weed. When young he was addicted to the use of spirituous liquors. He never



SPENCER'S BICYCLE.

had any mental labor of any kind, nor any care or worry. A curious feature of his life is that at the age of 105 he concluded to remain in-doors, and although being quite strong and active in his movements he did not leave the house during the last five years of his life. He did not use a cane, and at times was as active as a boy. He said he could move about the country as well as ever, and would give no reason for his voluntary seclusion. He retained his faculties to the end, and died quietly, and was buried in a field in his own farm.

It is interesting for a moment to look at the remarkable changes that have taken place during the lifetime of a single human being. Heal was born in the midst of the revolutionary war, and was nearly three years old when the surrender of Cornwallis marked the close of the struggle. He was in his nineteenth year when Washington retired from the presidency, and during his life all the presidents were nominated to their high offices. He was nearly fifteen when Louis XVI. was beheaded and the Reign of Terror began. He had entered on his twentieth year when Napoleon was made First Consul, and was 26 years old when he was



CHESLEY HEAL, OF MAINE, AT THE AGE OF 108 YEARS—FROM A PHOTOGRAPH FROM LIFE BY W. V. LANE.

elected Emperor. It was in his thirty-seventh year that the great commander was defeated at Waterloo. He lived during the period of the three French revolutions. During his life France had been three times a kingdom, three times an empire, and three times a republic. He was a boy in his teens when Robert Burns was composing his lyrics, when Burke was thundering in the House of Commons, and when Sir Joshua Reynolds was giving the world his great works of art. He was 28 when Fulton launched the first regular steamboat, and 66 when Morse first brought the telegraph into practical use by sending messages between Washington and Baltimore. It is almost impossible to conceive that a single life can span such epochs in history. A much fuller account, by Rev. George E. Tufts, of which this is an abstract, will be published in an early issue of the SCIENTIFIC AMERICAN SUPPLEMENT.

The Gases Occluded in Coal.

At the November meeting of the Newcastle section of the Society of Chemical Industry, the vice-chairman (Professor P. P. Bedson) gave a short account of some experiments on the gases occluded in coal, a paper on which subject he had read before the North of England Institute of Mining and Mechanical Engineers. He stated that some time ago a member of the Institute drew his attention to the remarkable behavior of a particular class of coal dust at one of the collieries under his superintendence; and suggested that it would be desirable to ascertain whether this particular coal dust contained gases inclosed in it, as coal itself does. The author said that the investigations of Herr Von Meyer in Germany, and of Mr. W. J. Thomas in this country, have demonstrated that coal holds varying amounts of gases inclosed in it—the gases consisting of mixtures of carbon dioxide, nitrogen, oxygen, and marsh gas (CH_4); and in some few instances other hydrocarbons related to marsh gas and olefiant gas (C_2H_4) have been found in the gases obtained from the coal. The gases inclosed in the coal were obtained by placing it in suitable vessels and exhausting them by a Sprengel pump, and at the same time heating the coal at 212°Fah. , drawing off the released gases by the continual flow of mercury.

An account was then given by the author of the results obtained by submitting coal dust collected fresh from the screens to a similar process. The coal dust was found to contain, like coal itself, gases occluded or inclosed in it, and in considerable volume. The analyses of these gases indicated a general resemblance in composition to those obtained by Von Meyer and Thomas, and further that the combustible portion of the gases consisted in all probability in part of hydrocarbons related to olefiant gas (C_2H_4) and of members of the series to which marsh gas belongs, similar to those forming the natural gas issuing from petroleum wells. A portion of the dust had been examined, by exhausting it successively at temperatures of 50° , 70° , and 100°C. , at each of which temperatures gas was given off which was separately collected and analyzed. The results tended to show a kind of fractionation of the paraffine hydrocarbons contained in the dust, the value of n in the formula $\text{C}_n\text{H}_{2n+2}$ being greater at the higher temperature. He added that as a coal dust from one source only had been examined, it would be premature to draw any general conclusions from the results obtained; but it is the author's intention to submit coal dusts and coals from different sources to a similar examination. Should further investigations confirm the results obtained, the existence of gases inclosed in coal dust, together with the nature of the combustible portions of these gases, will, it is thought, aid in some measure to explain the influence of coal dust in colliery explosions.

From the report of the proceedings at the meeting as published in the society's own *Journal*, it appears that in the discussion that took place at the close of the paper, Mr. Pattinson and Mr. Gatheral suggested that the loss of occluded gas by keeping might account for the lessened inflammability and the deterioration of coal kept for some time. Dr. Bedson said that this change was chiefly due to the oxidation of the coal, and that the amount of occluded gases was too small to noticeably affect the quality of the coal by their loss.

FISH may be scaled easier by first dipping them in boiling water for a minute.