His Alabama family couldn’t afford to send him to school. He began doing art seriously in his 60s. Now, at age 82, Thornton Dial is finally getting a big museum survey show that will display 70 of his large-scale works.

Mr. Dial—who is illiterate, tended animals as a little boy and later welded railway cars—translated his social messages into paintings and sculptures that are only now being embraced by the art world. “When I first saw some of his pieces, it was breathtaking,” says Bridgette McCullough, a Chicago art historian and an expert in African-American art.

Reflecting Mr. Dial’s background, the exhibit at the Indianapolis Museum of Art, which opened Thursday and runs through Sept. 18, is called “Hard Truths: The Art of Thornton Dial.” (The exhibit will later travel to New Orleans, Charlotte, N.C., and Atlanta.)

The paintings display a sort of hidden code designed to subtly communicate the artist’s social views. In one painting in the exhibit, “High and Wide (Carrying the Rats to the Man),” Mr. Dial used goat hides, clothing, carpet, barbed wire, and metal scraps found in backyards.

It looks like a big abstract collage, until exhibit curator Joanne Cubbs explains that the work is about a slave ship.