

Because of Alex—Notes on Trailblazers

by Clarence E. Schutt, Ph.D.

Last weekend, Alex, my 14 year old son with autism, resumed a project of building his own swimming pool in our back yard. He had begun last summer by directing a jet of water from the garden hose into an ever-expanding mudhole. Every so often, he would step into the ankle deep muddy water to check his progress. After several days, he had a breakthrough. He discovered that by planting our pet dog's stainless steel water dish in the middle of the mudhole he could create a clear water pool. He quickly realized that his eighteen inch "pool" didn't measure up to his expectations and redirected his attention to jumping into the small (6 foot) plastic pool he normally uses.

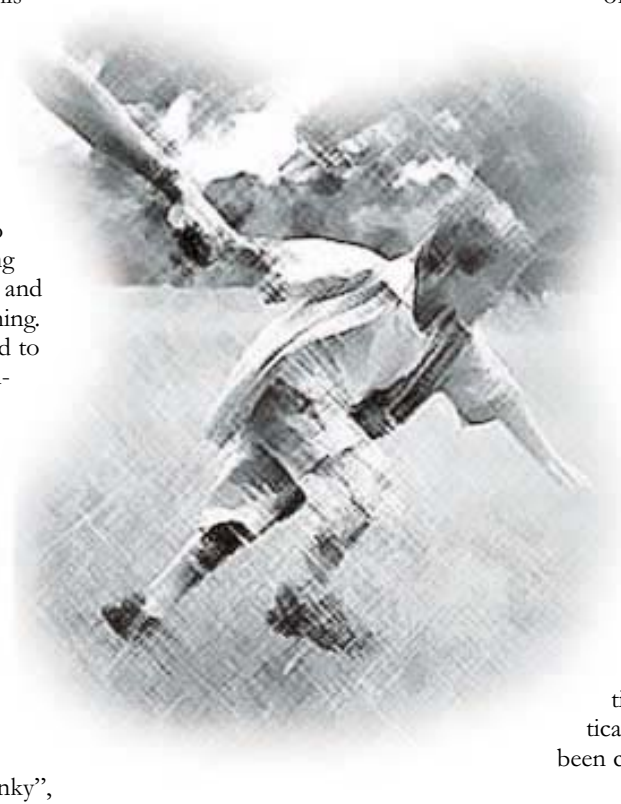
As I watched him stepping into his self-made pool, my memory took me back more than ten years to when I first established serious eye contact with Alex. I had been trying to catch his attention at the edge of the pool at our swim club by waving my arms and trying to get him to jump to me and, for just a fleeting moment, he looked into my eyes and jumped. That was just the beginning. Later that summer, we progressed to the point of diving to meet open-eyed under water, where we would begin to laugh and hug as we rose to the surface. Parents of "normal" toddlers asked me what my secret was in teaching him to dive with such confidence. I never knew where to begin.

My NAAR-related work often takes me to New York City to meet with potential donors or to attend meetings. A one-car train, affectionately known as "The Dinky", shuttles passengers between the Princeton University campus and the main line running along the Eastern Seaboard. It is not unusual to recognize someone at the station, a former student or fellow faculty member. A brief nod of recognition or exchange of pleasantries is enough to maintain our distance as we seek out separate seats on the train. I like to use the hour-long trip into the City to read recent issues of *Nature* or *Science*. Often some article sets me to musing about cures and treatments for autism - Alex is never far from my mind. Indeed, in the past few months I've spent the time on the train reading about sensational discoveries reported by some of my Princeton colleagues.

Once I get off the train at Penn Station in New York and begin to make my way through the crowd, it is rare that I spot anyone I know from among the hundreds of persons I pass. It is a curious and generally unremarked fact of human nature that in the instant it takes to scan a face we immediately real-

ize that we *don't* know someone. Some researchers believe, based on recent brain imaging data, that individuals with autism find it difficult to perform this everyday act of magic and avert their gazes to avoid trying. Maybe so.

Occasionally in one of New York's many museums or galleries, or along Park Avenue, a "celebrity face" will jump out and a little shot of adrenaline surges through my body. Recently, near Broadway, I unexpectedly ran into two well-known Californian advocates for services for adults with autism. Their faces were instantly recognizable, even though we see each other only once per year and I had no reason to suspect that they would be in New York. No brief exchange of pleasantries on that occasion!



Trailblazing...

Several lines of research suggest that the hippocampus in individuals with autism may not be functioning properly, perhaps because the number of neurons is reduced, or available neurons are not able to sprout "mossy fibers" of high enough density for high speed processing of complex inputs (like faces or sentences). But, I've never had much worry about Alex's spatial memory or ability to plan.

One winter's day, when he couldn't have been more than six years old, he took my hand and headed out across nearby Springdale Golf Course, through the Einstein Woods, all the way to the chained gates of our summer swimming club, a half mile away, where he had first learned to swim. It amazed me that he charted a course quite different from the route traveled in the reliable old 1953 Buick Special that usually carried us down the short dusty road to the pool. I should have anticipated that Alex wouldn't understand the chains and locks at the gate keeping him from the water on this cold

Professor Charles Gross, a distinguished colleague of mine in the Psychology

Department, has spent many years studying the mechanisms in the brain responsible for face recognition and for perceiving one's place in space. He recently published an article in *Science* demonstrating that neurons in the hippocampus, the region of the brain required for associating immediate sensory information with long-term memory, can be replenished, contradicting the long-held view that brain cells do not divide. This pioneering discovery offers hope that damaged brains might be repaired by stimulating natural restorative processes by the application of growth factors or pharmaceuticals. The hippocampus has sometimes been called "the gateway to the mind".

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winter's day and the image of him violently shaking at the gates haunts me still.

Scientists are beginning to understand at the biochemical level how the connections between cognition and emotion are mediated by hormones, and surely this knowledge will help our children. Charlie Gross co-authored the *Science* paper on neuron rebirth mentioned above with another Princeton colleague, Professor Elizabeth Gould, a rising star in the neuroscience firmament. Liz was one of the first scientists to demonstrate that neurons in the hippocampus respond to steroid hormones by increasing or decreasing the number of potential sites on their surfaces that can synapse (“join with”) other neurons in the “nets” of neurons that capture and refine our thoughts and memories.

This important discovery reveals one of the ways in which our brains respond to stressful situations and how emotional states may affect learning. Conceiving or fixing a plan in our minds seems to require hormonal stimulus to maintain or strengthen active memory and learning circuits. We all learn better when we're excited. There is an excellent book by Antonio Damasio on the “mind-body” problem (*The Feeling of What Happens*) in which he argues that “consciousness”

itself, the sense we have that we are here, may be just another emotion.

On that cold day at the gate, Alex just couldn't adjust to the fact that his plan had been thwarted. It must have been hard for him to drop it, not that he didn't understand, but because his powerful determination was sustained by strong neural-hormonal circuits that he couldn't control. I sometimes wonder if sometime ten thousand years ago, when the human population dwindled to a dangerously small number, whether some autistic person led our species to safety, or to a fresh water supply, because they had the determination and clear-headedness to blaze a new trail. ♦



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