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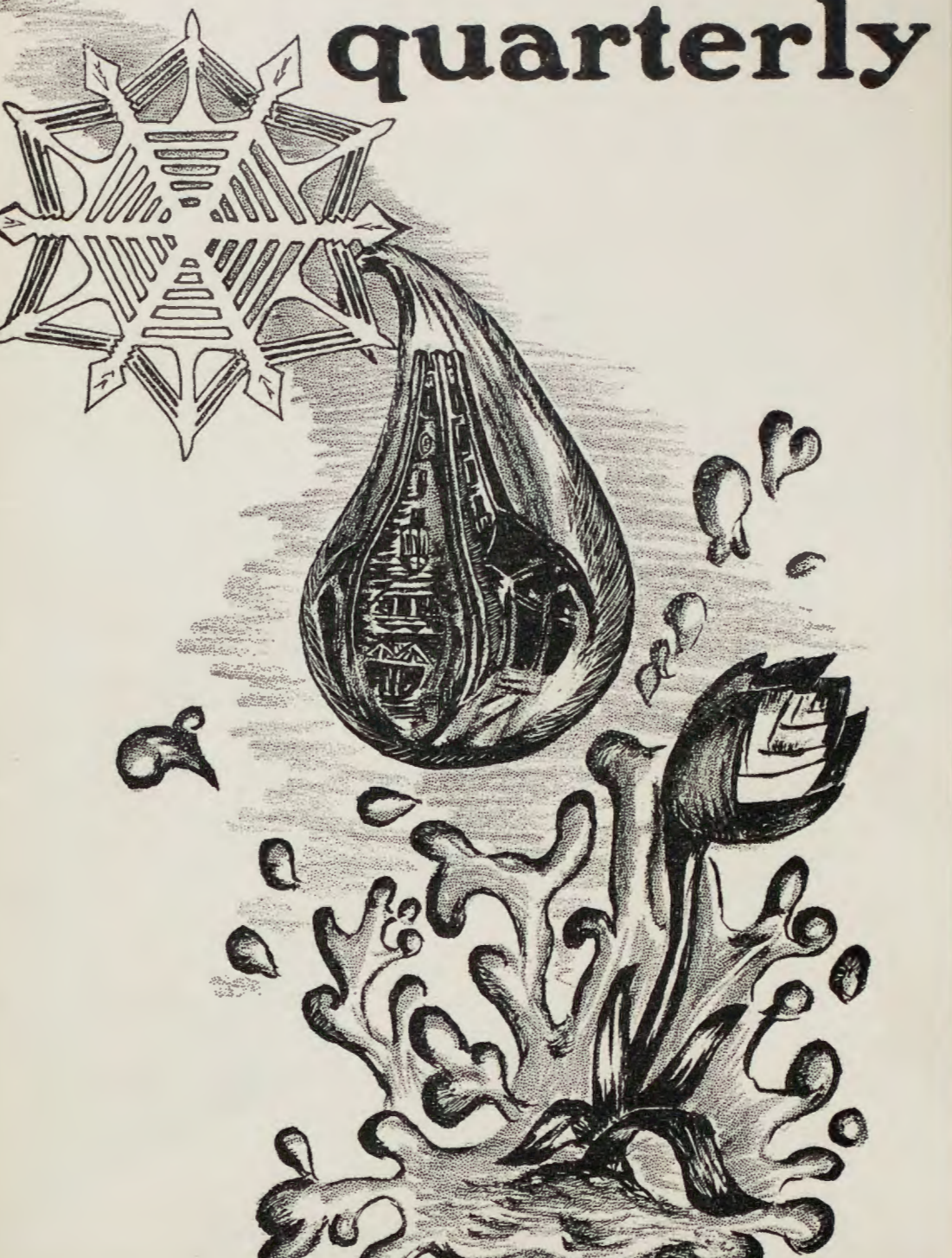

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Uncle Ned

by D. M. Ross

DURING the years of the Second World War, the boys on our street would often gather in the close, quiet heat of midsummer afternoons and play "soldiers."

Our battleground was a weedy lot at the end of the block, and there we would discuss the tactical situation for that particular day. For the most part, the lot was used to simulate the jungle of the South Pacific, for the war in Europe was now over, and all that remained for the Allied powers was the conquest of Japan.

The battles were always short and bloody. For some reason, we always seemed to be on the defensive, and the enemy attacked only from the front and flanks. The assault was vicious and the fatalities numerous, but ultimately the foe was repulsed, and the defenders were left to nurse their wounded and bury their dead.

Dying seemed to carry special pleasure. The act of the dramatic collapse and the cryptic death-rattle was openly cultivated, and there were among us five or six acknowledged experts.

After a short critique of the action, we would usually retire to the shade of someone's front steps and listen to the dry chatter of the locusts. It was on such a mid-summer afternoon, as we sat on someone's front steps, that I decided to tell my friends that my Uncle Ned was coming home from the war.

Uncle Ned was a tall, lanky man. He walked in a peculiar, disjointed manner as if his feet hurt him. His hands were large and unattaractive, and his nose was hooked; but when he laughed he contorted his entire face, and I remember that even his ears would move.

From the outset, he had made me a celebrity in my group, for "uncle" to my neighborhood cronies usually meant an older, balding man, a little short-tempered and smelling of cigar smoke. But my uncle was young and enthusiastic, and he knew what six-year-old boys were interested in and what they considered important.

He was not married at this time and before he was drafted he had lived with my grandmother. He had earned his living driving a hearse for a local funeral parlor, and I remembered that one of my first ambitions was to grow-up and drive a hearse through red lights behind a motorcycle escort.

On weekday evenings he coached the parish basketball team, and every Saturday afternoon my friends and I would wait for him to come to my house and show us how to dribble a basketball or throw a football. To our young minds he was a wonder, and each of my friends privately wished that he could be their uncle, or that they could have an uncle like him.

If I had been proud of him as a youthful, energetic relative who drove a hearse through red lights and could dribble a basketball better than any man alive, it was nothing compared to my sentiments when the Army sent him to the Philippine Islands to fight the Japanese; I was the only boy in the neighborhood with a close relative in the war. His letters were photostated and censored with a thick black pencil: my Uncle Ned was a real soldier, and, in the manner of children, a portion of the wonder and respect which my companions felt for my relative was transferred to me. I assumed the role of expert in military matters, inventing facts I did not know, exaggerating, beyond all proportion, facts I did know. Now I was prepared to drop the bombshell: Uncle Ned was coming home.

After a few minutes, the bell of an ice-cream truck sent everyone scrambling off the porch to get money. I remained on the steps: the information I carried was too important to be distracted by the business of buying ice-cream. I had planned my entire declaration, and even some replies to likely questions.

When my friends had returned, and the truck had disappeared down the street, I waited for a pause in the conver-

sation. When it came, I said casually, "My Uncle's coming home from the Philippines at the end of the month."

As I had expected, there was no immediate response.

After a pause, John Keller asked, "Your Uncle Ned?"

"Right," I answered triumphantly.

The fact that my Uncle was a soldier was a particularly sore point with John. His father was an air-raid warden and even I had to admit that Mr. Keller was impressive, when, during an air-raid drill, he walked around the block in his steel helmet and first-aid pouch. But this was not as important as having an uncle who was an actual soldier in combat. With that cruelty peculiar to children I never failed to remind John that my Uncle Ned was more important to the war effort than his father. Of course, he would argue the point, but half-heartedly; we both knew who was right.

The porch was silent for a moment.

"Why is he coming home," John spoke up belligerently, "the war's not over."

This was the opening I had awaited. I paused discreetly, and then said in a soft voice.

"He's been wounded."

All eating stopped. Tom Kelly stood up.

"Is he dying?" he asked.

"No, no, but he's coming home for good this time. He said he was going to bring me a Japanese flag with a bullet hole in it."

Excitement and anticipation flushed away any resentment or jealousy they might have felt. All of the admiration and all of the good times which we associated with Uncle Ned returned now, and the group broke up quickly, as if each of us wished to go off and recall and enjoy these things again privately.

I hoped that this homecoming would be like the last, for after basic training, my uncle had been set to Australia, and, six months after his departure, he was granted a furlough.

He had not notified us of his two-week leave and when he drove up, our group was playing ball in the street. For a moment I did not recognize him: his face was tanned as it had never been, and his features seemed older and wiser. But he

grabbed me as he always did, a little awkwardly, one hand on each of my shoulders, and pushing in until I yelled. This made him laugh, and his ears moved. My friends crowded around him, and he threw us some fly balls that almost reached the trees over the street, and then he walked down to see my parents.

We stood and watched him and noted that he walked just the same, his lower arms jerking upward slightly with every step he took.

"Where's his uniform?" John Keller demanded.

"My uncle's not a show-off," I replied sharply, but I had to admit that I was disappointed at this oversight.

A few minutes later, Uncle Ned came out of the house and called me. It was gift time, and I sensed it from his pleased secretive attitude. He had returned home with a quantity of Australian money, jewelry, stuffed Koala bears, and the many sundry things that homesick soldiers buy. He spoke enthusiastically about Australia, for he was fascinated by the continent and its people. As he talked, I assured myself that he had not changed in the slightest; that, like all good things, he would never change; he would always like to come out in the street and throw high flies to me and my friends.

I showed my compatriots my booty from the foreign land, trying to repeat as completely as possible my uncle's description of each.

I told John Keller, "This Koala bear is just like a real one, except they put felt where its claws were."

Is it man-eating?" he asked.

I did not know but I said that it was.

"My father says that there's no fighting in Australia," John said quickly, trying to surprise and fluster me.

"Well," I answered quite truthfully, "he's been in training."

Up to this point, my uncle had not been introduced into combat. But after he had left, my mother told me that his unit was not returning to Australia. This was all the information we had.

A year and a half passed before I saw my uncle again. His disjointed, censored letters referred to Guam and New

Guinea, and my father said that fighting in the jungles of the South Pacific was the most difficult fighting possible. But now my uncle was returning home, totally deaf in one ear from an exploding artillery shell, and, I hoped, with a captured Japanese flag.

For the next two weeks our war games were intensified, and every conflict was now concluded with an heroic capture of the enemy's flag. This honor I reserved for myself, and my right to it was uncontested. We reflected at length on what we would ask my uncle when we saw him, and we invented harrowing war stories which we thought worthy of him. The excitement of my friends, and the anticipation of my family made the next two weeks pass very slowly.

He returned by plane on the evening of the last Saturday of the month, and my family went to my grandmother's house to meet him. His flight did not arrive until after midnight, and at ten-thirty I gave up and fell asleep on the living room davenport. I awoke a few hours later in an upstairs bedroom, Uncle Ned was sitting on the bed.

"Hello, Mike," he said.

He did not grab me as he usually did, but he ran his hand through my hair in an almost embarrassed manner. His face reflected the light from the hallway, and I could see that it was weary and dull. He wore an unkept mustache.

"You're bigger," he said, grabbing my bicep with his big hand. I did not know what to say.

"Did you bring the flag?" I finally asked.

"No," he said apologetically, "I'm afraid I lost it. I do have something for you here."

He reached into his pants pocket and brought out a single row of three campaign ribbons. There were five battle stars on it. I wondered how I would explain the flag to my friends.

I saw my uncle only one day the next week, for he spent much of his time at the Veteran's Hospital and visiting his friends. He came over to my house one afternoon, and my friends soon gathered around him. But they sensed that he was uneasy and they stood around shyly, asking nothing more than how he was. It was hard for me to hide my disappointment at the way things were turning out.

That Sunday, my family went over to my grandmother's house for supper. After the meal we went out to sit in the back yard. My uncle remained in the house and after a while I went back in to ask him to play catch with me.

I found him sitting in an arm chair in the living room. The chair faced a french window. The house was totally quiet, and I approached the rear of the chair on tip-toe, thinking he might be asleep.

He was not asleep; he sat in the twilight staring out the window. His eyes were wide and blank and below his mustache his mouth was open slightly, one end wider than the other, so that his mouth seemed crooked. I had never seen an expression like that. He looked like a man staring at some horror, which he had seen many times over.

His mouth closed.

"Go away . . . please," he whispered.

I stood there for a moment longer. His eyes never left the window. I turned and walked out of the room as quietly as I had entered, and went outside and threw a tennis ball against the side of the house. In some small way, I knew that my life would never be exactly as it was before — indeed, that nothing would be exactly as it was before.

A Long Cold Winter

by Robert Carter

FOF SOME REASON, I sit down near the front tonight. I don't know exactly why, because most of the time I stand around in the back of the church. Maybe it's because of the cold weather and my wet feet. Anyhow, I just feel like sitting with a lot of people — not talking, just being near them. Sometimes I feel that way.

The priest is saying the Prayers At The Foot Of The Altar. Everytime I hear that mumbling, it reminds me of my Latin teacher, Mr. Padovic. He was a real thin, nervous guy, who was always making jerky motions toward his shirt pocket during class, as if he was dying for a cigarette and knowing that he couldn't have one gave him the twitches.

I sit down next to some big lady in a terrible-looking red coat. She's reading her missal and I almost have to send up a flare before she moves over. It reminds me that I should've brought a prayer book. I'm always forgetting things like that. When I do, my mind wanders and I start looking at all the people and wondering what they're thinking about. I know it's not right. The nuns always told us we're supposed to participate in the Mass. In a way, I do, but sometimes I'd just rather look at the people.

The priest gets up at the lecturn and reads the Gospel, and when he reaches the part: "Thus far are the words of today's Gospel," I realize that I'm not even paying attention, because I start to sit down like a lot of others. But he goes right into the Credo without a sermon, so we all have to stand up again.

What I was thinking about was the Virgin Mary. It's the feast of the Immaculate Conception and all us late-sleepers

are attending the 6:00 p.m. Mass. I could have missed Mass. Sometimes I do. I kind of dig Mary, though, since she was a human being. Anyway, I think she's a pretty cool chick. A nun bawled me out for saying that in a conversation once, but I still think she is. They always want to make Mary into some kind of untouchable yo-yo who's either praying or looking grief-stricken all the time. I know girls like that. They're sickening.

Like I said, my mind's wandering and all of a sudden I see them passing the collection basket. There's three young kids about two rows in front of me. One five-year-old girl holds out a handful of pennies and squeezes them through her stubby fingers a few at a time. All of a sudden, I feel rotten. Not just because I only have a penny to my name, but inside. I know I only have one cent, because that's how much change I have left after buying my last pack of cigarettes. Anyway, I have this hollow feeling in my stomach like a million tons of gravity are pulling right there. My head gets real heavy and I'm so dizzy that I'm scared I might pass out.

The lady in the red coat puts some money in the basket, like it's all she has in the world. I feel sorry for her. Then I hand the basket to the usher real fast, because I'm embarrassed about not giving anything. When I look up, one of the kids, the little, blue-eyed, blond girl, is looking at me sort of accusingly. Man, I feel cheap. It's as if she's watching to make sure everyone puts in something the way she did.

I start to run my hands through my pockets, as if I want to give, but can't find my wallet. The girl isn't fooled for one second. Then I find this dollar in my inside coat pocket. I'm wearing my winter storm coat, and the dollar must have been left over from some time when I had lots of money. I'm always sticking bills in any pocket that's handy. I feel like going up to the girl and saying, "Hey, I'm gonna give this to the usher right after Mass." But she'll probably want to follow along to make sure I do.

I decide that there's one main reason why I feel so lousy. It's my aunt. I guess she's not so bad, since she took me in. She could have put me in an orphanage. But she's always bitching about my late hours and study habits and all that

jazz. Anyway, I keep thinking about the lousy weather and going home to that stuffy apartment. When I walk in she'll say, "Where you been? Out with those juvenile delinquents again?" And I'll say, "No, I went to Mass." She'll sniff (she's always doing that) and look at me like I'm a liar and say, "You ought to go in the morning so you don't waste study time." Then she'll start harping about the grades. She always does.

Thinking about my aunt makes me forget all about Mass. For some reason, I remember what my Dad used to tell me about insects. He said that spiders ate pests like the flies and mosquitos that I was always yelling about in the summer. I hate all bugs, but he was right. I do complain all the time. My father was crazy about nature. You can have it.

I'll tell you how much I hate bugs. Once up at the lake where we used to own a cottage, I caught some flies around the place and dropped them in a spider web. They struggled and the whole web quivered, but the spiders came down on those flies sure as hell and sank their fangs into them. I know spiders have fangs, because my Dad told me. After a while, the flies would stop struggling. I couldn't look. I guess I'm the world's biggest S.O.B. I even told it in Confession. A real sadistic thing to do. Besides, I kept on thinking about a giant fly yanking me out of bed some night and dropping me in among a big batch of hairy tarantulas.

Then I remember that I'm at Mass. The Consecration bells are ringing and I'm beating my chest and saying, "My Lord and My God." My mind is a million miles away and I'm saying it like a machine. About the only thing I remember by heart from the Mass is that and the "Domine, non sum dignus"—and the Pater Noster, of course. The nuns made us memorize those two prayers in Latin. I like the "Domine, non sum dignus." It means "Lord, I am not worthy." When you get trained to do a thing a certain way, it just becomes a reflex action like when they taught us our Catechism and how to make a confession. It reminds me of this Pavlov guy I read about. Everytime he rang a bell, his dog drooled at the mouth.

It's a funny thing, but as dumb as I am, I do read a lot. My best grades are in English, although that isn't saying

much. This nun I have, Sister Mary Paraclete, is always knocking me for lack of unity and coherence. My grammar isn't so good either, but it has improved a little. She liked some of my more 'sane' ideas. For instance, I wrote about a kid whose mother sends him to school with some money in an envelope for his first grade teacher. The little kid doesn't know any better, so he folds the envelope and sticks it in his pocket. While he's running around the playground, the envelope rips and some of the money falls in his pocket. Later on, he gives the sister an envelope with only a few coins in it. When she asks him about it, he finds the money in his pocket. Well, this teacher believes he ripped it open on purpose. At first, she calls him a thief. Then, just so he'll admit it, she says, "Maybe you wanted to give me the money all by yourself. That would have been all right." But this kid has been taught that it's wrong to lie and he denies everything. The nun gives him the third degree until he starts crying. Then she sends him home. It isn't much of a story as far as plot goes. Actually, I wrote it one day after my parents died in that car smashup. Nuns aren't really mean. A lot of times, they just don't know any better.

Once my English teacher asked me if I was reading any good books. I told her about one where a high school student, Holden Caulfield, keeps getting kicked out of different schools. He's sort of cool in a mixed-up way, because he hates phonies. In fact, he reminds me of a lot of guys I know, mostly of myself. Anyway, this nun tells me to stop reading trash. She keeps pushing Shelley and Shakespeare. I don't mind "Macbeth" or "Hamlet" so much, if someone explains the far-out words, but Shelley doesn't impress me at all. She raved about his poetry. Only I read up on the part of his life story that she left out.

The dollar is still crinkled up in my hand. It will buy three beers, or a pack of cigarettes and a phone call. You see, I promised to call Sandy up tonight. She hinted that I should drop in when her folks are away. Somehow, I don't feel like it tonight. Not that I'm square, or anything, I just don't feel like it. You know, when you're kissing a girl, you can think of all kinds of silly things — Mickey Mouse, the priest in the

eighth grade who used to give us our sex talks, and even of some other girl. Half the time I feel like laughing. I always remember the story a Jesuit told us about two couples who were killed in a parked car by their own exhaust fumes. They were found lying together. That priest made an impression on quite a few of my friends. For a while the story bothered me. Not knowing if you're going to die some day in mortal sin could be a worry.

When I look around, I see little pools of water in the aisle. I can smell the wet coats and socks around me. The candles are flickering. Probably the sacristy door is open. Father Irving is on the left side of the altar, reading the Last Gospel. Suddenly, I realize what's been in the back of my mind during the whole Mass. That little girl is watching me again. She reminds me of another time, about five years ago, when my parents were alive. It was on Christmas and we were in another city and another church. I remember, when the usher came down the aisle, my mother looked at me. She didn't say a word, just looked. There was a half a buck in my pocket, a whole allowance. Like tonight, everyone was dropping in big green bills. And I remember thinking about how the Catholic Church was probably the richest organization on earth, and what did it need my 50 cents for? When the usher came by, I shoved out my arm and dropped in the money like it was burning my hand. My mother told me later on that it was such a nice thing to do and she smiled. I just looked at the floor and then walked away. It hadn't seemed like such a great thing to me. If you really want to know, I did it so some kid overseas could have food. Like those pagan babies, the ones the nuns are always talking about. Still, I wonder sometimes if those sisters aren't shooting a lot of bull about going to church and not touching girls. What the hell does God care? He made us that way, didn't He? But that was all five years ago.

When I watched the people going up to the Communion rail, I got confused again. I haven't done it myself in over a year. They tell you that God is in the Eucharist, but I can't work up too much enthusiasm about it. I never felt like God was really in me. I don't know what I expected, maybe just more. And if I feel funny inside, I figure the reason is because

the nuns told me He would be. But if I didn't believe the bread became Him, then I could chew up the host without blinking an eye. I can't do it though.

The little girl is still staring at me. I think — maybe she's taking the place of my mother. It's a stupid idea, but just the same my adam's apple seems swollen and my head starts to ache. What a damn baby I am. Everybody dies.

People around me start genuflecting and running for the exits. I move along with them to keep from being trampled. It's kind of funny in a way.

The usher is standing beside the doorway. I can feel the dollar, like a soggy ball, in my hand. So I straighten it out and smooth over some of the wrinkles. Then I walk up to him and hold it out, without saying a word. He looks at me with a dazed expression on his face.

"Take it," I say. My voice sounds like a car starting in the early morning.

He takes the dollar without seeming to care one way or another. Some people are just not cut out to be ushers. He's one of them. I look around for the little blond girl, but she's not around. "The Lord loveth a cheerful giver," my Dad used to say. He was full of corny sayings like that.

"Hey, Mike." Herman Jones is calling me from the back of the vestibule. He just came down from the choir. I kid him about his name sometimes. A lot of people don't believe it's not a phoney. He has to show his draft card all the time to prove his age.

"What d'ya want?" My clothes are all sweaty. It seems like I've been asleep or in a trance during the whole Mass.

"Let's go down to the pub and lift a few."

He always has to use some out-of-the-ass word like pub instead of bar or tavern.

"I can't. I'm broke."

"Sure you are. I saw you slip that bill to the usher. Whatsamatter? You gettin' religious or somethin'?"

"Just a moment of weakness. I'll watch it next time, Hermie, my good man."

"I'll bet you won't go drinking 'cause you're scared of what your aunt will say." He's got a simple little smile on his

pimply face.

"Stuff it, jerk. I'm broke." I glance around, realizing that I've spoken too loud. Some hyper-thyroid looking woman is giving me the bad eye, and wouldn't you know it, holding her hand is the same solemn little girl. "Let's get outa here. I could use a coupla quarts."

When we get outside, I feel how cold it is. "Hermie, I don't think I'll go to the PUB after all."

"I'll pay. You don't have to get mad."

"I'm not. It's just that I got a girl lined up. You know how it is."

"Oh . . . sure. D'you think she has a friend? It's a long cold winter, ya know what I mean?"

"Not tonight. Maybe she can fix you up some other time. I'll mention it."

"Who is she?"

"Uh-uh. I keep the good ones for myself."

"Yeah," he yells at me, as I cross the street, "I bet you ain't got a girl at all!"

He really gets on my nerves sometimes. I walk along the left side of the street where there's no sidewalk. All the people, in a hurry to get home, are driving down the icy streets like idiots. One of them honks his horn. The big yellow headlights go rushing by me and the tires are skidding. These people don't see that all the RPM's in the world won't help them on the ice. Some of the cars come pretty close to me. The thought crosses my mind that one of them might hit me, but I can't get particularly aroused about the whole idea. I just keep on walking.

Some guy has his car jacked up by the curb. His left front tire is leaning against the side of the car. He's wearing a peak cap with ear flaps.

"Ya need any help?"

"No, thanks anyway."

He seems like a nice guy, but I'm glad he says no. If he really knows how to change a tire, he can do it faster by himself. Man, that wind is howling. I'll bet his tire bolts are frozen on.

Walking in the winter wind is friendly in a way. It's like

two little boys daring each other. The whole thing becomes a contest between me and nature. When my face starts to ache and my eyebrows feel frozen, then I like to yell "C'mon you old cornball. Is that the best you can do?" It makes the time go faster and sort of takes the sting out of the cold. If anyone ever saw me, he'd think I was nuts.

I try to cut through the traffic to the other side of the street. Finally, there's a small gap and I run through like Johnny Unitas, or somebody. There's a girl walking home from Mass in the dark. She has on a grey coat, a red check babushka and ratty-looking white socks. I slow down so I won't catch up with her. For about a block, I stay ten yards behind her. A lot of people are on the street, but she keeps on glancing over her shoulder and walking faster. I have no intention of bothering her. All I want to do is get out of the cold. But just because she can't see my face and I can't see hers, she thinks I'm a maniac and gets in a panic. This girl will run home and lock the door and feel all relieved because her virginity was saved for another night. It makes me want to laugh.

Another of my father's sayings comes to my mind, "Laugh and the world laughs with you, cry and you cry alone." Did you ever laugh so deep down that it started ripping in your belly and you had to tilt your head back so that it could all escape? Did you ever laugh because you felt like waving your arms and yelling and rolling around in the snow? Well, that's the way I'm laughing. God, but it's funny.

Some Notes on the Quantum Theory

by Paul Fleury

TOWARD the close of the last century, physicists generally conceded that physical science had run its course, that all of the major physical laws of nature had been successfully incorporated into consistent theories through the efforts of men like Newton and Maxwell, and that it merely remained to work out more carefully some of the esoteric implications of these theories. Physical theory in the twentieth century, however, is better characterized by revolution than refinement. For with the advent and success of the theory of relativity and the quantum theory of matter, the illusion that material reality had been exhaustively investigated was quickly dispelled. Both of these revolutionary theories were born of the failure of existing theories to explain new experimental data. However, because of its more violent departure from the classical physics of Newton and Maxwell, we shall be concerned here with elements of the origin, fundamental content, and implications of the quantum theory. We shall mention Einstein's relativity only because it cannot be ignored in any discussion concerned with the important scientific theories of our century.

In order to appreciate the contrast which quantum physics presents when viewed against the background of its classical predecessor, it is advantageous to explicate the structure of scientific knowledge in general and then to enumerate and compare specific essential elements of Newtonian and quantum

mechanics. Knowledge in physical science proceeds through orderly observation, hypothesis, deduction, and experimental verification. More explicitly, when certain phenomena, A, are observed, careful note is taken of the conditions under which the observation is made. A reasonable hypothesis (in the form "if B, then A") is constructed in the hope of discovering the mechanical cause of A. From the hypothesis, B, other phenomena, C, are often deducible. Experiments are then devised to verify whether in fact C does occur. If C occurs, credence is lent to the hypothesis, because it is then able to account not only for A (for which it was constructed) but also for C (a prediction independent of the constructural character of the hypothesis). The correctness of the hypothesis is further ramified by subsequent verifications of other phenomena which may be deduced from it. Thus, the method of scientific theory is based upon the hypothetical syllogism, the theoretical construct occupying the position of the major term and the implication or observable, that of the minor term. To any student of logic, it is obvious that within such a framework one does not attain certitude as to whether or not the theory is correct, since confirmation of the minor term does not necessitate the truth of the major. On the other hand, this logical framework does provide certitude in a negative sort of way inasmuch as negation of the minor is sufficient to necessitate abandonment, or at least a modified re-statement, of the major. Also, whereas a purely deductive framework affords logical certitude, its content is intrinsically limited, for there is no channel in the purely deductive syllogism through which new information may be introduced. Finally, regardless of the criticism to which the hypothetico-deductive framework of scientific reasoning is liable, it must be admitted that within this framework man has progressed far in his control of nature, if not in his ultimate understanding of it. Indeed by virtue of the outstanding success of their theories, Newton and Maxwell were often deemed to have discovered something intimate concerning the nature of material reality.

Newtonian mechanics declares that once the forces acting on any particle are known, all subsequent and antecedent motion of the particle may be exactly determined through the

equations of motion. In fact, Laplace is said to have observed that if the positions and momenta of all particles in the universe were known for some given instant, all future and past events as well as their times of occurrence could be predicted by solving Newton's equations. Such an observation is equivalent to asserting that Newton had fathomed the mysteries of material reality, a feat which should have inspired confidence of the first magnitude in physics and its method of pursuing reality. Such confidence did ensue and persisted for centuries, but it was to be undermined by new experimental evidence, disclosed in spectroscopy and other fields, which indicated that matter in motion on the atomic level did not always obey Newton's equations. Thus, for the first time, qualifications had to be introduced into the realm of applicability of a theory previously considered universal. And this was not the only blow which classical physics was to suffer, for the discovery of the photoelectric effect and the successful analysis of blackbody radiation required that light be treated as the procession of particle-like entities called photons, rather than as the propagation of continuous electromagnetic waves, which was assumed in Maxwell's theory and which was so successful in explaining the phenomena of interference and diffraction.

The radical assumptions and complex mathematical formalism which were necessitated to explain atomic phenomena formed the bases of the quantum theory. The formalism is expressed equivalently through Schroedinger's wave equation and the Heisenberg matrix mechanics. Intimately intertwined with the basic assumption of quantum mechanics is the Heisenberg principle of uncertainty or indeterminacy, which has provided in its implications substance for much discussion. In the language of the physicist, the principle might be stated as requiring of any system that the simultaneous indeterminacy in the specification of values for any two canonically conjugate variables has a definite lower limit, which is of the order of magnitude of Planck's constant. Now the extreme smallness of this constant suggests its insignificance in systems falling within the realm of ordinary experience, so that the uncertainty principle does not effect the applicability of Newtonian mechanics on the macroscopic level. However, for

atomic systems, wherein the values of the dynamic variables are infinitesimal, the consequences of Heisenberg's principle are quite important. The uncertainty principle strikes at the very foundation of Newtonian mechanics by pointing out that the values of all dynamic variables are not exactly determinable, as Newton assumed, but rather that there is an intrinsic uncertainty in the specification of the values of any pair of conjugate or complementary quantities. For example, whereas in Newtonian physics it is in principle possible to determine exactly the position and momentum (conjugate variables) of a particle at the same time, quantum physics recognizes that in increasing the accuracy of specification of one of these quantities beyond the limit imposed by Planck's constant, a corresponding or complementary inaccuracy is necessarily generated in the specification of the other. As a result, the product of the uncertainties or inaccuracies in the specification of the pair of quantities must exceed Planck's constant. It is unfortunate that elementary atomic physics texts often introduce the uncertainty principle by way of an imaginary attempt to measure position and momentum simultaneously; for the reader is likely to receive the impression that the uncertainty principle deals more with the theory of measurement than with a basic assumption regarding the nature of physical reality. The extent of this assumption is realized after some reflection on the respective approaches of classical and quantum physics to the specifications of the state of a system. In classical mechanics the state of a system is specified by assigning precise numbers to the important dynamic variables such as position and momentum. From this specification all the important properties of the system, including kinetic and potential energy and angular momentum, can be deduced. Thus, since the specification of state defined the values of all dynamic variables for all times through the equations of motion, the *state specification contains all that can be known about the system.*

In quantum mechanics, on the other hand, the specification of state, that is, what we can know about the system, is limited by the uncertainty principle. Thus several systems which are identical initially as far as our measurements can

indicate, may possess state functions quite different from one another at a later time, even though they have been acted on by the same forces. However, if mechanical causality is to have any meaning, the subsequent state of a system ought to depend on the state at some earlier time. In recognizing this requisite, the originators of quantum theory introduced the psi function, which specifices the state of a quantum mechanical system in terms of a sort of probability amplitude. Thus was the statistical character of quantum theory born.

At this point, a clarification must be made. Statistical analyses and probability distributions are no strangers to classical physics. One has merely to consider the kinetic theory of gases and statistical mechanics, which employ Newtonian laws, but which treat the large numbers of particles comprising the system under consideration as an aggregate, ignoring their individual identities. One is perhaps tempted to say that there is nothing so startling after all about quantum mechanics. This may be true to the extent that matrices, differential equations and probability functions were known to, and employed by, physicists long before the advent of quantum theory. However, statistical methods are employed in classical physics where convenience dictates, the assumption being that it is always possible, albeit cumbersome, to write down exact equations of motion for all the particles comprising any system. And there is nothing in the nature of classical physics to forbid ones fixing his attention on an individual particle and following exactly its mazy meanderings through the most complex system.

The situation is essentially different in quantum mechanics, since a given initial state does not determine any subsequent state uniquely, but must do so only statistically. Thus, whereas, a Newtonian system must be in a definite state if it was previously in some other known state, the quantum system may be in any one of an infinite number of subsequent states, though certain of these are very much more probable than others. In other words, the employment of statistical method in quantum mechanics is not a matter of mere convenience; it is a matter of necessity. As Reichenbach observes, the "if-then-always" of classical physics is replaced in quan-

tum physics by "if-then-a certain percentage of the time."

We now see that the price paid for a theory capable of assimilating the experimental observations of atomic physics is indeed a high one. Determinism and causality in the strong sense of the term fade into the relatively shadowy notions of tendency and probability. However, the structure of mechanical causation implied by quantum mechanics exhibits little change from that implied by classical physics, for in both it proceeds from specification of initial state, through the medium of the equation, to the inference, to a subsequent state. In classical mechanics the equation is Newton's; in quantum theory it belongs to Schroedinger. The determinism of Newtonian physics dies under fire of the uncertainty principle which is so closely coupled to the fact that state specification must be made in terms of a probability function rather than through exact determination of dynamic variables.

While the physics of quantum theory is indeed revolutionary, it is the interpretation of the physics which has precipitated so much debate among scientific philosophers in recent years. The most widely accepted interpretation, enunciated primarily by Neils Bohr and Werner Heisenberg at Copenhagen in 1926, forms a consistent and rather complete philosophico-scientific system. It is based on the contention that one cannot accept the experimental data of atomic physics and consistently deny the theory which explains them, and further that one cannot accept the theory and deny its implications. Whether the Copenhagen interpretation is unique or not is a matter of heated discussion, for its conclusions are quite discomforting to all who would hope for an eventually complete representation of physical reality through science.

A fundamental of this interpretation is the so-called principle of the indivisibility of atomic phenomena. Perhaps this can best be described by dividing reality into observed and unobserved systems. Let us first consider a macroscopic system consisting of a tennis ball in motion toward a wall. If we observe the system at time, T_1, we see the ball proceeding toward the right. Somewhat later, at T_2, when we again observe the system, the ball is traveling toward the left. Now we can correlate these two observations by employing the principles

of conservation of energy and momentum, for we can calculate the path which the ball traveled. In other words, we are able to subdivide the event and to calculate what took place between our observations. To verify the correctness of our calculations, we have merely to perform the experiment again, this time observing the tennis ball throughout its flight. If we duplicate the initial conditions exactly, the result will be as we calculated and we shall have no reason to conclude that the behavior of a macroscopic system depends on whether or not it is observed.

On the other hand, let us consider a microscopic system composed of a source of light, an obstacle containing two slits, and a display screen. Shining the light through the slits produces on the screen a pattern of dark and bright regions which is explainable through quantum mechanics and expressible in terms of the probabilities of photon population of the various segments of the screen. Thus, again we have a theoretical structure from which we can infer the experimental result. However, when we attempt to formulate meaningful questions concerning what occurred between the emission of light from the source and the production of the diffraction pattern on the screen, we become entangled in anomaly. For example, the question as to which slit a given photon passed through is meaningless because the question itself implies that a photon has an exactly determinable location, and this implication leads directly to a contradiction of the uncertainty principle — upon which is based the theory enabling us to predict the observed phenomenon. It was the futility of just this sort of question which led Bohr to assert that the atomic or subatomic phenomenon is indivisible. An atomic system must be considered to consist in only what is observed. At the base of this statement is Bohr's recognition that on the atomic level, a clear distinction does not exist between the process of observation and the thing observed.

Thus there is an essential difference between bouncing a tennis ball off a wall and bouncing a photon off an electron. It makes sense to discuss what happens to the tennis ball between T_1 and T_2 because observation may be made of the interim. But for the photon, we simply do not know what hap-

pens in its "flight," and if Bohr is correct, we shall never know. The implication here is that for all his dissection of material reality, for his discovery of the proton and electron, of the meson and neutrino, the physicist can not tell us what stands at the base of physical nature. He is unable to analyze the elementary processes because his microscope is too large. Yet this inability should not be unexpected, since his tools of observation do not shrink as he examines smaller and smaller systems. This is not to say that all hope for eventual analysis of elementary processes is extinguished. For Bohr's interpretation of quantum mechanics is not unchallenged. As Einstein, leading the opposition to the Copenhagen interpretation, has expressed it:

> Some physicists, among them myself, can not believe that we must abandon, actually and forever, the idea of direct representation of physical reality in space and time; or that we must accept the view that events in nature are analogous to a game of chance.

Although thus far no one has been able to supplant the Copenhagen interpretation with a more consistent and satisfying approach, Bohr's interpretation leaves unanswered many questions. One of the most salient of these begins to emerge from a careful consideration of Bohr's view of the uncertainty principle, manifested through his principle of complementarity. When it is stated that, below the limit imposed by Planck's constant, the more exactly we know the momentum of an object, the less accurately we are able to know its position, one is inclined to think that the object really has an exact location, but that we speak of uncertainties merely because we have not the wherewithal to discover this location. Bohr's point is that not only can we not measure it, but more importantly the object has no location in any more precise sense than the limits observable in conjunction with the uncertainty principle. Thus, if we were able to contrive an experiment in which we could measure the momentum exactly, the object would not be localized; it would literally have no position.

The philosophy which Bohr associated with quantum mechanics is, according to Fr. MacKinnon, a sort of "semi-idealism" which contends that macroscopic objects are real, but that submicroscopic objects achieve reality only through

being observed. It is certainly difficult to see how observation is able to play the part of creation, and yet this is precisely its role in the Copenhagen interpretation. The apparent absurdity of this conclusion is heavily offset by the fact that all other interpretations of quantum theory thus far proposed fall far short of the extent, consistency, and success of the one propounded at Copenhagen.

On the side of the "realist," who takes the position that things must have existence of themselves, is MacKinnon's observation that Bohr takes no note of the different ways of knowing. But a more striking counter to Bohr's position rests on the fact that we base our conclusions concerning microscopic systems upon the ultimately macroscopic evidence of our senses. Thus the utilization of such microscopic conclusions to impose restriction on how macroscopic data is to be acquired appears to cut the ground from beneath the microscopic conclusions themselves. Another facet of the conflict is that of language. When we apply to atomic systems terms which have been defined from observation of the macroscopic systems of ordinary experience, we must take care to acknowledge the analogous sense in which these terms apply. Such care is not often taken; for it often requires entire new vocabularies. The thread of identity which must connect descriptions of reality at both levels has not yet been distinguished in the realm of linguistics. It is true that such a thread is often thought to exist in the similarity exhibited by mathematical expressions of certain laws for both levels. But such similiarity is often defined into the formalism and does little to clarify the connection between the microscopic and macroscopic worlds.

In this treatment we have barely indicated the direction in which lie some of the problems connected with reconciling modern physics to traditional theories of knowledge. But it should be evident that the implications of quantum physics and particularly the Copenhagen interpretation should foment much thought, discussion, and (it is hoped) eventual clarification of our ideas of space, time, and causality. Such agitation alone seems sufficient justification for concern with the philosophy of physics.

A Night in the Beartooths

by John Kenny

AT FIRST, isolation had made us uneasy. By the map, our old Buick was ten miles away, parked in a meadow adjoining an unfrequented section of Montana highway; on foot, the distance had been considerably greater, for we had climbed and hiked over and around countless obstacles. We were beginning to enjoy our solitude, however, now that our third day in the Beartooth Mountains was passing into early evening, and some of our initial chest-beating enthusiasm had returned. Camping and fishing had been a pleasant diversion after the interminable spring semester, and the awareness of being far from civilization had made everything romantic and exciting. Gradually our camp had become comfortably familiar. Marks of habitation were everywhere: soap stains on the bank of the stream where we washed the cookware, soot on the rocks which made up the fireplace, pine chips on the ground by the cut firewood. Somehow these blemishes gave the landscape a homelike atmosphere. Only the peaks around us told us we were trespassers; skyscrapers would have been more comforting.

Right now, however, the sky was overcast, and darkness was rapidly making the mountains invisible. Soon our universe was no bigger than a sphere of firelight. Our shadows stretched impressively behind us as we squatted around the campfire, drinking a last cup of hot chocolate. Sunset was bedtime at that altitude, for the quick drop in temperature made it desir-

able to get under the blankets in a hurry, before the near-freezing night air made them too cold to warm up. I donned all the extra clothing I had with me, crawled into my make-shift bed, and pulled an army-surplus blanket up to my chin.

I was lying on my back watching the starlight sift through the clouds when it began to rain. It was not a violent mountain storm with great booms and flashes, only a soft, persistent drizzle. The babylike cries of the rock rabbits came less and less frequently, and soon the only sounds to be heard were wet sounds: the muted hiss of raindrops striking rocks and the sibilant hum of the stream as its pace quickened. I slid deeper into my sleeping bag and propped up a section of blanket to protect my face.

About midnight an acute chill between my shoulder blades startled me out of a light sleep. I tried to twist away from the growing area of dampness beneath me, but moving was no use. It merely caused the porous material of the sleeping bag to soak up water faster. Shortly afterwards, the water that had seeped down from above began to penetrate my clothing. I was getting wet more rapidly under the blankets than I would if I exposed myself to the rain, for it was still descending in a fine drizzle. I decided to get up.

Dave and Bob were already trying to start a fire. They had dug some relatively dry wood from the center of the pile, but igniting it in that weather proved to be difficult. A good half-hour elapsed before we had, almost by force of will, built up a sizeable blaze. The next few minutes we spent trying to discover the position which would keep us the warmest. At length we found that most of the body would be exposed to the bitter night regardless of posture or position. The fire had turned out to be little more than a morale-builder. We stood hunched around it and contemplated the hours ahead.

It was now about one o'clock. The humor of our situation was becoming apparent. We had come prepared for the cold but had scarcely considered the possibility of something as common as rain nine thousand feet above sea level. Our initial naivety inspired a few droll comments. "Nothing like a cold, wet night to dampen your zest for camping," said Dave crouching down and stretching his hands over the fire." "Me for the

decadent luxury of the city," added Bob ruefully. Conversation began to deteriorate. We descended from morbid jokes about our plight into a petty argument about who was the wettest. When this ended in a three-way draw, we quit talking.

At two o'clock an icy wind had begun to blow across our valley, and all the humor, rueful or otherwise, had gone out of the situation. Our silence was now as much from necessity as from inclination: we could not open our mouths without breaking into uncontrollable chattering. About two-thirty, Dave, who was standing opposite me, glanced up and stared for a moment at the sky behind me. "Look!" he exclaimed, pointing. A dark patch had appeared in the clouds over the cliff that formed the northern border of our camp. We knew that it was clear sky, for in its center was a single star. As it inched toward the southern horizon we watched eagerly for other signs that the clouds were breaking up, rejoicing inwardly as the dark patches became larger and more frequent. By three-thirty the rain had stopped, and starlight had given a ghostly cast to our vigil.

It got colder, and I realized for the first time that people actually freeze to death. I looked at Bob, then at Dave; both were grim. I thought of a war movie I had once seen in which two soldiers sat in a foxhole on a wintry night trying to keep each other from dropping into the easy sleep which supposedly precedes such a death. I tried to view our situation in some such heroic light but failed; I only felt stupid standing where I was, cold, wet, and miles from shelter, after I had risked my neck to get there. Then too, I realized, almost with disappointment, that we were in no danger of freezing to death.

From four until six our spirits were at their lowest. We might have been three savages for all the protection that education or civilization could afford us. It was a frustrating and humbling experience, as when a snowstorm immobilizes the most modern of cities, or when a cloudy night prevents the astronomer's long-proposed observation. We were not moving around much any more. Every motion seemed to bring some new area of damp clothing into contact with the skin. At last indications of dawn began to appear in the East, and, while

we knew that it would not get warm until the sun had climbed much higher, we were encouraged by this tangible evidence that our troubles were coming to an end.

Two hours later, when the sun had climbed high enough to send its first direct rays into our valley, we gave a subdued cheer. It would have been jubilant but for exhaustion. The air would warm up quickly now.

We remained in the mountains for three more days, and, although we found much to enjoy, a kind of childlike credulity had passed out of our lives. Nature was no longer an exotic state in which arid lives became meaningful, nor was it a benevolent mother with balm for wounded spirits: it was merely a universal condition of life, as often hostile as friendly.

The Breach

by James O'Sullivan

IT WAS a fine afternoon, late in April. The sun shone warmly through the dining room windows and across the table where we sat, eating the special nutcake which Mom made every Easter. My father was in high spirits. That morning at Mass he had even sung the *Resurrexit Dixit* with the parishioners. He liked to sing the alleluias, and that afternoon, he and mother and I were going to listen to a broadcast of The Messiah. We had finished lunch and my father was talking gayly at the table, when Jeff Miller and his younger brother, Robert, came and invited me to go on a hike with them.

"Can I go, Dad? Can I go?" I asked eagerly.

My father frowned, hurt by the fact that I preferred a hike with my friends to an afternoon with the family.

"You don't have to go today," my mother said.

"But it's such a nice day. We won't be gone long."

"Very well," said my father, the joy having already gone out of the occasion. "Don't be late for dinner."

We ran almost all the way to our destination, a railroad tunnel about a mile from our house. I was glad that my father had not asked where I was going, for I was sure that the railroad would be off-limits. We talked about trains and how exciting it was to watch them rumble by and to imagine where they were going and what strange things were in the cars. Yesterday, Jeff and I had found some transformers lying in a gully near the tracks and had taken them home with us. I had hidden mine in the garage with my father's tools, thinking that some day it would be useful.

We came to the field which sloped down to the ravine, through which the railroad tracks ran until they plunged into

the tunnel. The sides of the ravine were steep and covered with shale, which made it difficult to climb or descend. One by one, we slid down the side of the ravine until we all stood by the tracks about a hundred feet from the entrance to the tunnel. I looked into the blackness; just a small spot of light showed at the other end.

Robert, who was playing on the other side of the tracks, called me and Jeff. He had turned over a stone and under it was a nest of baby snakes. Jeff and I began to throw stones at the snakes, while Robert watched. I was looking around for another stone when I noticed two men coming out of the tunnel. Immediately one of them shouted, "Hey, you damn kids," and started to run toward us. We dropped our stones and ran. Jeff scrambled up one side of the hill, and I, the other. Robert followed his brother. As I climbed, my feet slipped on the shale. I could hear one of the men slipping on the shale below me. He cursed and yelled, "Stop, you little devil." Then he must have fallen, for the next thing I heard was the sound of something rolling down the hill. I looked back and saw a short fat man at the bottom.

Reaching the top of the ravine, I looked over and saw Jeff on the other side. He, too, had made the top, but Robert was having a harder time. I continued running until I reached the crest of the sloping field. Then I paused to look back again. I saw that the other man had caught Robert, and Jeff was going back to help his brother. I waited a minute to catch my breath, and then ran home.

I went to my room without seeing my father or mother, wondering if I should tell them what had happened. I also wondered what those men would do to Jeff and Robert. About an hour later, the doorbell rang. I listened to rough voices in the hallway. Then I heard my father call, "Mike." Though I wanted to hide, I went downstairs.

"That's the third one," said one of the men, pointing a bloody finger at me. His coat was dirty and torn. "I'd recognize that red hair anywhere." It was the man who had fallen down the ravine.

My father said that there must be some mistake and invited the men to explain what had happened. The short fat

man started to talk, but he was too angry to be coherent. His companion, who was also fat but much taller, then told my father what had happened. The two men were railroad detectives. Yesterday someone had broken into a transformer box that operated a semaphore near the tunnel; train schedules had been interrupted and the damage amounted to several hundred dollars. The detectives accused us of the crime. "They broke the lock with stones," said the shorter man. "I saw them do it."

My father looked to me to explain. I started to tell them everything that had happened. But all the while I was telling the story, I kept thinking of the damning transformer in the garage. I told them that we had found the transformers by the railroad tracks and had taken them home. "But we didn't break open the box," I said. The men laughed and said that I was in serious trouble. Then they took the transformer and left, saying that they would be in touch with us.

When they were gone, my father asked angrily, "Why were you playing by the tracks?"

I started to mumble an answer.

"Mike, why did you break into that box?"

"But we didn't, Dad," I answered.

"Don't lie to me, Michael!" my father shouted. "You were at the tunnel yesterday. The detective says he saw you break the box. The transformer was found in our garage. Now how can you expect me to believe that you didn't steal it?"

"You have to believe me, Dad. You have to believe me. I'm telling you the truth. We didn't break open the box." I searched my father's face for some sign of confidence.

"Go up to your room," he said, "and start to think about telling the truth." I went to my room, confused and hurt.

The following weeks were terrible ones for our family. The detectives had called several times on the phone to see if we were ready to admit our guilt. But Jeff, Robert, and I continued to tell our story exactly as we had on the day we were caught. The fact that our stories never varied, was the only indication of our innocence. The detectives had also gone to see my teachers at school, who had defended me, saying that I was a well-mannered boy who never caused any trouble. In

all this time, however, we did not know the progress of the charge against me. When my mother asked what was happening, the detectives told her that there would be a trial "soon." When that "soon" was, she could never find out. As time passed, the uncertainty of the situation distressed my mother more and more. Every ring of the telephone made her start.

My father, however, remained unchanged. I pleaded with him to believe me. I told him that Jeff's father trusted him, and that my teachers had confidence in me. Soon this desire to gain my father's trust became my sole objective. I didn't care about the false charges of the detectives anymore; it didn't matter whether I was guilty or innocent. The only thing that concerned me now, was my father's trust. But when repeated attempts to achieve that trust failed, I began to resent my father. I stopped pleading with him and avoided him as much as possible. My father reciprocated with silence, and the breach between us grew with each day.

When my mother saw what was happening to my father and me, she made an attempt to reconcile us. One evening after dinner, she pleaded with us to make peace. There was silence for a moment, while I avoided looking at my father. Then he said, "I'll make no peace with a son who persists in a lie and has no respect for his father." Later that evening mother said to me, "Mike, don't ignore your father. Please talk to him, for my sake."

"It wouldn't do any good," I answered. "He won't listen to me." Mother never mentioned the matter after that, and a heavy silence descended upon the house.

Then one day in early June, a man came to the door. He said that he was a representative of the B & O Railroad. He stayed only for a moment to tell my mother that some other boys had confessed to breaking into the transformer box, and that the charges against me were being dropped. There were no apologies. He just said, "Your boy is cleared," and left. Of course my mother and I didn't care about apologies; we were too overjoyed with the news. My mother phoned Jeff's mother, and I decided that I would go up the street to see Jeff.

At Jeff's house, we reviewed the whole incident. We mocked the fat man, who had cut himself on the shale. We

laughed at the way he ran. We thought what fools they had made of themselves, and how stupid those detectives really were. We talked of how we knew all along that we would be declared innocent. In short, the whole affair was rapidly acquiring the glamour of a tale from the distant past.

After an hour of telling our tale to each other, I went home. As I walked in the door, I saw my father and mother talking in the kitchen. When he saw me, my father smiled and said, "Hello, Michael. I just heard the good news."

In that moment my resentment returned. "Hello, Mom," I said, ignoring my father.

"I'm sorry about what happened, son," my dad said. "Let's be buddies again."

"You don't deserve to be my friend," I said and went upstairs to wash for dinner.

I think that evening at dinner was worse than any of the ones we had spent during the long period of indictment. We waited for father to say grace, but he sat silently. My mother started to cry and left the room. My father sat quietly for a moment, and then he, too, left the table. I sat there staring at the steaming food and empty chairs, feeling that something had gone wrong.

In the following months, father and I both recovered somewhat from that act of childish malice, though the breach between us was never completely healed. By some silent compact, neither my father nor I ever mentioned the affair again. That was a long time ago. When I remember that incident now, years after my father's death, and think of everything that he did for me, I still feel remorse for the pride and stubbornness of my youth.

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